FRITZ J. FRANK
President

J. H. VAN DEVENTER
Editor

C. E. WRIGHT
Managing Editor

J. A. ROWAN
News Editor

A. I. FINDLEY
Editor Emeritus

R. E. MILLER
Machinery Editor

F. J. WINTERS
Art Editor

T. W. LIPPERT
Metallurgical Editor

Associate Editors

F. J. OLIVER

W. A. PHAIR

G. RICCIARDI

F. JURASCHEK
Consulting Editor

Washington Editor
L. W. MOFFETT

Resident District Editors

T. C. CAMPBELL
Pittsburgh

ROBERT G. BINGHAM
Chicago

D. R. JAMES
Cleveland

W. F. SHERMAN
Detroit

Editorial Correspondents

F. B. RICE-OXLEY
London, England

ROBERT G. MCINTOSH
Cincinnati

G. FRAZAR
Boston

P. FIDRMUC
Hamburg, Germany

L. E. MEYER
Milwaukee

CHARLES POST
San Francisco

F. SANDERSON
Toronto, Ontario

ASA ROUNTREE, JR.
Birmingham

LEROY W. ALLISON
Newark, N. J.

ROY M. EDMONDS
St. Louis

F. T. TURNER, JR.
Buffalo

★

Owned and Published by

CHILTON COMPANY
(Incorporated)

Publication Office
Chestnut and 56th Sts.,
Philadelphia, Pa.

Editorial and Executive Offices
239 West 39th St.,
New York, N. Y.

OFFICERS AND DIRECTORS

C. A. MUSSELMAN, *President*
FRITZ J. FRANK, Executive Vice-President
FREDERIC C. STEVENS, Vice-President
JOSEPH S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JOHN H. VAN DEVENTER, JULIAN CHASE,
THOMAS L. KANE, CHARLES S. BAUR,
G. CARROLL BUZBY, P. M. FAHRENDORF

★

C. S. BAUR, *General Advertising Manager*
A. H. DIX, *Manager Reader Service*

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index.
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 a year. Single copy, 25 cents. Cable Address, "Ironage, N. Y."

ADVERTISING STAFF

Emerson Findley, 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Chestnut & 56th Sts., Philadelphia, Pa.
H. K. Hottenstein, 802 Otis Bldg., Chicago
H. E. Leonard, 239 W. 39th St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 239 W. 39th St., New York
W. B. Robinson, 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.

THE IRON AGE

Contents

DECEMBER 15, 1938

"Bugs" Protect Jobs and Investments 23
Carnegie-Illinois Opens Irvin Works 24
Precision Machine Tools Built by Welding 30
Factory Built Steel Houses in Production 35
Vibrating Screens and Conveyors 37
Jobbing Die Steels 42
Design Developments in Press Brakes and Presses 45
On the Assembly Line 52
Washington News 56
THE NEWS IN BRIEF 70
Weekly Ingot Operating Rate 81
Rate of Activity in Capital Goods 81
Plant Expansion and Equipment Buying 96

▼ ▼ ▼

New Industrial Literature 104
Just Between Us Two 115
Products Advertised 116
Index to Advertisers 138

Copyright 1938 by Chilton Company (Inc.)

Sailor or Steel User

...you must KNOW where you stand

A Western manufacturer was confronted with a problem of broaching square holes in vises made from tough semi-steel chrome nickel alloy castings. The broach bar formerly used was made in one solid section from an oil hardening steel, and its service life was short. Our representative suggested a unique type of broach made from a heat treated steel shaft into which toothed plates of L-XX high speed steel were set. We also made recommendations for heat treating and air cooling to avoid distortion. The new broaches are giving exceptional results.

Just as the navigator shoots the sun to check his course, so must the maker of fine steels constantly check his product to insure exact correspondence with every specification.

Allegheny Ludlum helps metal-working men find where they stand. If you doubt the efficiency of any operation involving fine steels—if you have any question requiring an answer in terms of suiting the steel to its job, it may pay you to consult Allegheny Ludlum. The A-L Research Department works with actual production problems, combining metallurgical experience with practical engineering knowledge. Result: peak efficiency of A-L steels in service; savings and profits for A-L customers.

Address your inquiry to Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh, Pa.

ALLEGHENY LUDLUM
STEEL CORPORATION A-L **PITTSBURGH, PA.**
Steels of Today and Tomorrow

▲▲▲ THE IRON AGE ▲▲▲

DECEMBER 15, 1938

ESTABLISHED 1855 Vol. 142, No. 24

"Bugs" Protect Jobs and Investments

THE motor manufacturers did a pretty good job last week before the Monopoly Investigating Committee. When you consider that they had to explain the workings of invention and the effect of patents to a group practically none of whom knew much about inventions, patents or manufacturing operations from first hand experience in industry, they did a darn good job. "Ket" is chiefly to thank for that. "Ket," as Charles F. Kettering of General Motors is affectionately known to industry, is so highly charged from long personal experience with knowledge of what invention and research accomplish for human progress that he radiates conviction. When "Ket" talks on these subjects, even a group of mummies would stand up and cheer.

The Committee, and particularly its chairman, Senator O'Mahoney, seemed especially worried about the possibility of some new invention coming suddenly which would throw the industry on the scrap pile, close the plants, put their labor on the dole and destroy the equity of investors. Some bright inventor might wake up some morning, perhaps, with an idea for an automobile with a cellophane solar motor, a plastic body and a rubber transmission and bang! Away would go the automobile industry, the oil industry and the steel industry.

In this connection, "Ket" might have told the worried committee about "bugs." Bugs of a kind that the committee members had never heard about.

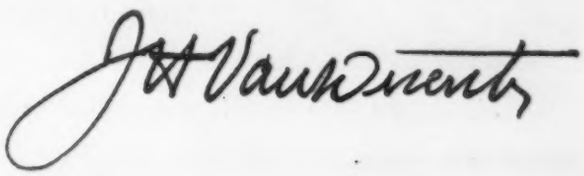
The path of industry is strewn with bugs or it might be better to say is alive with them. They particularly infest new inventions. So much so that they have created thousands of jobs for industrial bug exterminators. High paid ones, too. "Ket" himself has served his time in that profession.

For the benefit of any layman who might chance to read this, I will explain that "bugs" are the unforeseen and unforeseeable mistakes, difficulties and setbacks which accompany all inventions and new developments from the dawn of the idea to its successful commercialization. The more complex or important the invention, the longer it takes to get rid of them.

Getting the bugs out of a new idea of any importance in the mechanical field, and this includes getting the bugs out of its marketing and distribution as well as exterminating the technical ones, means a lag of anywhere from seven to 20 years for any inventions which are important enough to have broad social consequences.

In the case of the automatic cigarette machine, the lag was 33 years from the construction of the first machine to the time that its consequences made an impression on employment in the industry. In the case of the automobile, there was a lag of 33 years from the invention of the internal combustion engine to the time when horses and buggies began their exit.

Bugs are nature's safety devices for preventing economic dislocations through the coming of important new ideas. They do a more thorough job than restrictive legislation ever will.



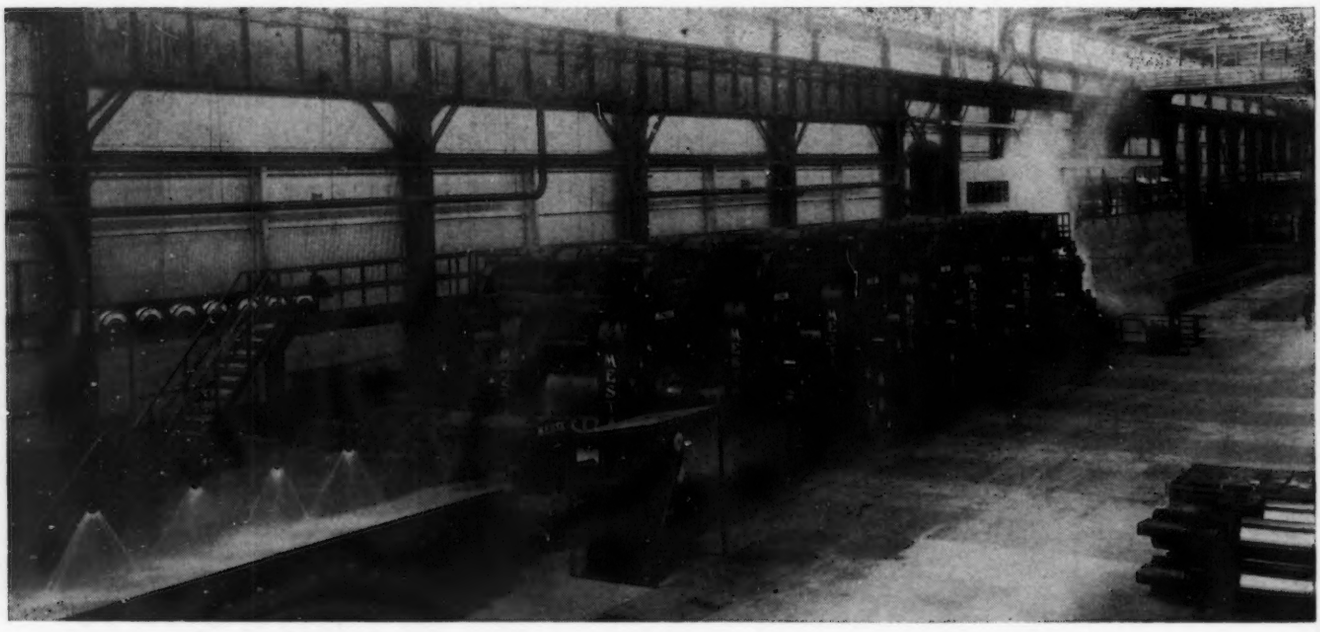
Carnegie-Illinois Opens New Irvin Works

WITH the formal opening of all departments of the new Irvin Works of Carnegie - Illinois Steel Corp. on Dec. 15 in the presence of several hundred guests, the corporation's facilities in the Pittsburgh district have been substantially expanded. The completion of the Irvin Works, for which ground was first broken on May 22, 1937, puts the corporation in a position to supply, in this district, either hot or cold rolled strip or sheets from 18 to 77 in. in width, in practically any desired finish, as well as cold reduced tin plate and tin mill black plate.

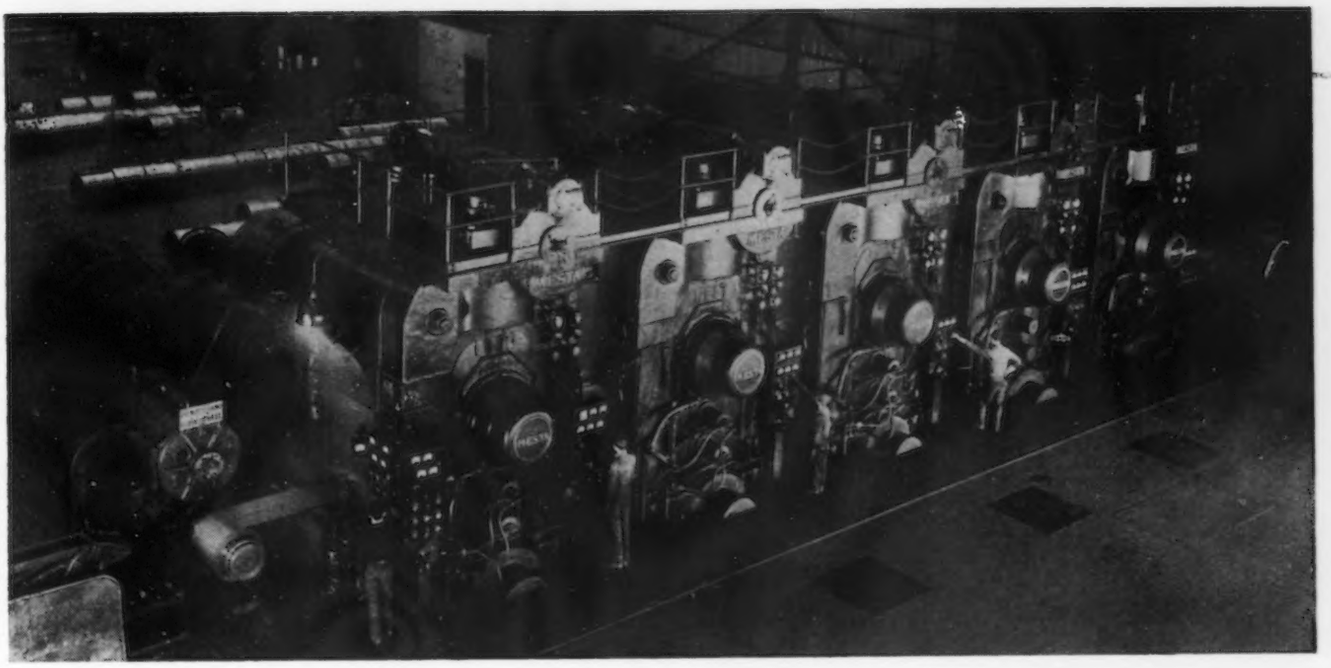
The principal divisions in the Irvin Works are an 80 in. continuous hot strip mill complete with facilities for finishing hot rolled strip and sheets, a complete cold reduced strip and sheet mill with the necessary pickling, annealing and finishing facilities, and a complete cold reducing tin plate mill. The continuous hot strip mill (basic factor of the production flow of the entire works) is nominally rated at an annual capacity of 600,000 gross tons.

The plant site covers 653 acres and is situated on a hillside overlooking the Monongahela River, between Dravosburg and Clairton. The group of buildings in the plant itself has an overall length of 4275 ft., and an overall width of 1229 ft. Included in the works are a river pumping station, reservoir, and water treatment and sewage disposal plants where all plant wastes which might cause stream pollution are treated before discharge to the river.

The new mill will be operated on a smokeless basis, gas being used throughout with the exception of two boilers in the powerhouse. Electric power supply comes in from transmission lines at 66,000 volts and is transformed for plant use at a sub-



Six stand finishing train in 80 in. hot strip mill. Rated capacity, 600,000 tons annually.



42 in. five stand tandem cold reduction mill.

station adjacent to the mill proper. The substation includes three 3-phase 69,000/6900 volt transformer units each having a self-cooled capacity of 25,000 kva. and a forced-air capacity of 33,333 kva. Large a.c. motors for the mill and the Monongahela River pumping station are supplied directly from the 6600-volt distribution system. Medium and small-size a.c. motors, lighting transformers and miscellaneous loads, are served from 6900/460 volt auxiliary transformers.

o o o

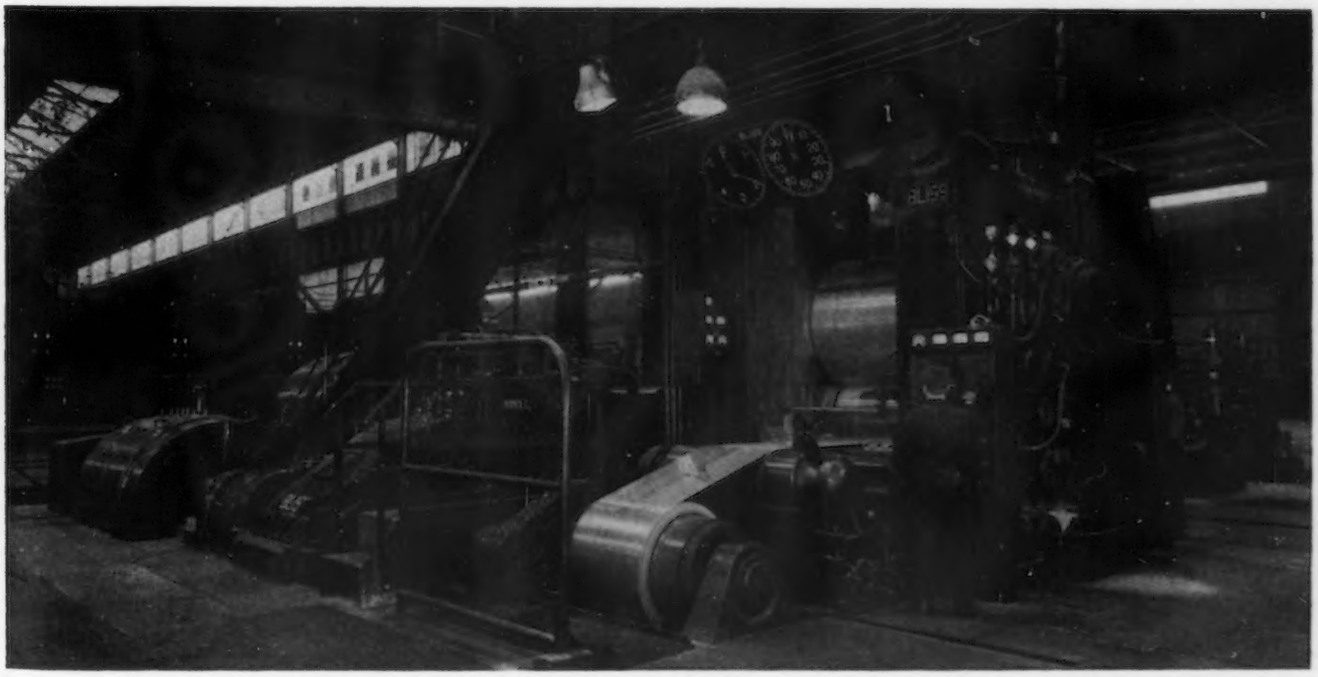
The cold reduced tin plate division of the new plant was the first to be completed. Strip pickling, cold reduction equipment, and all facilities for the production of tin plate were ready for operation in March, 1938.

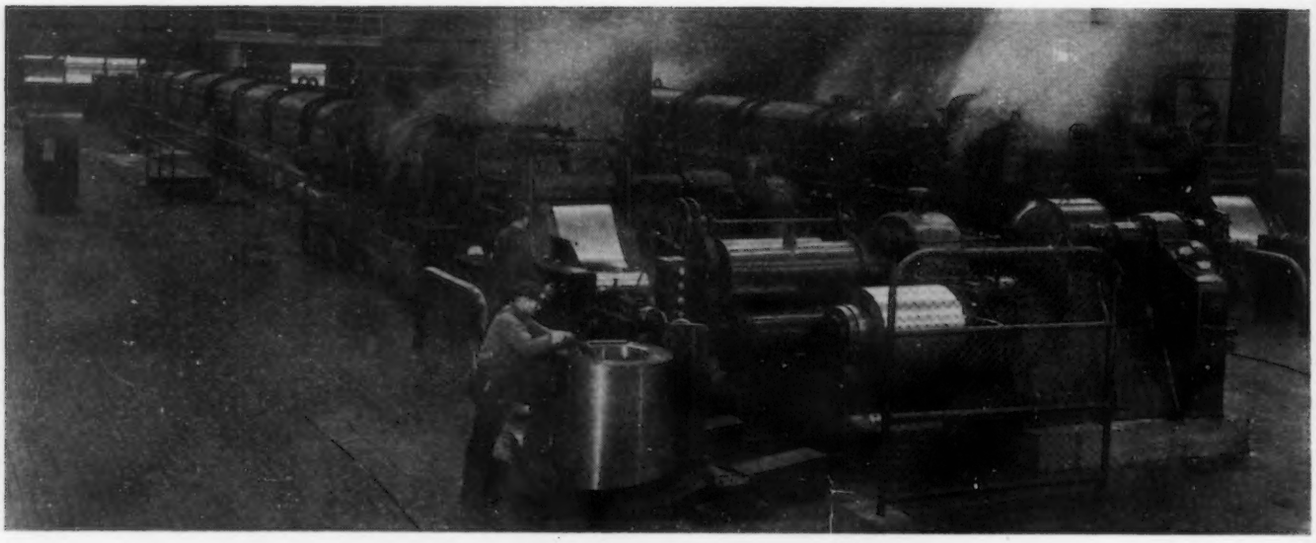
Pending completion of the remainder of the plant, coiled strip was shipped in from the company's McDonald 43 in. hot strip mill at Youngstown.

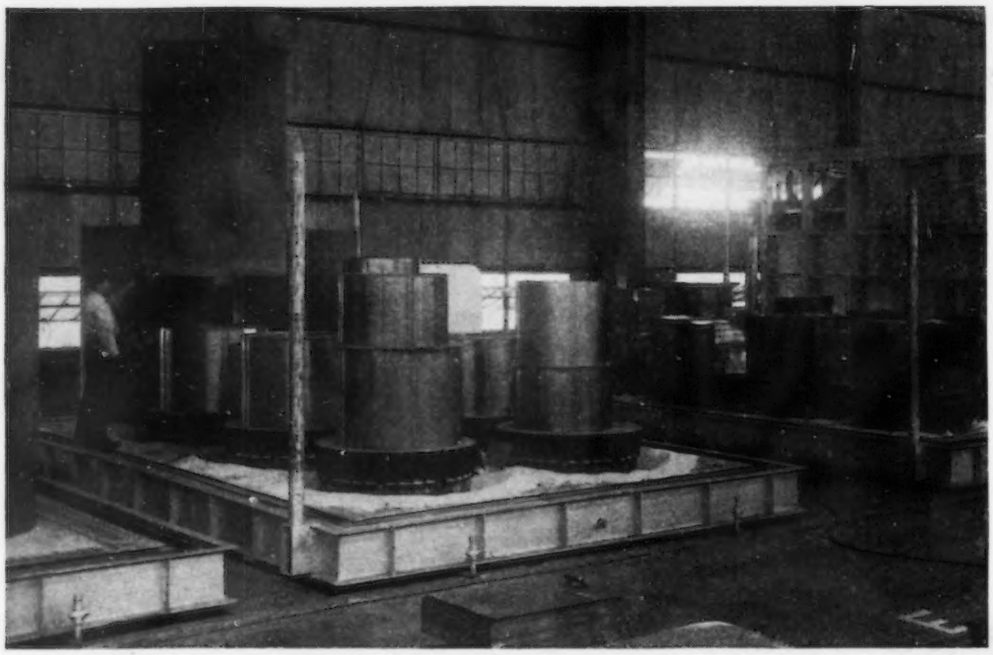
Slabs for the Irvin hot strip mill are shipped in over the Union Railroad from the Edgar Thomson Works, approximately six miles away. To assure a steady supply of slabs to the Irvin mill, the Edgar Thomson plant

o o o

Delivery end, 54 in. reversing mill.







ABOVE

Continuous electrolytic cleaning lines.

o o o

AT LEFT

Placing cover over coils preparatory to annealing in tin annealing department.

o o o

BELOW

General view of tin temper mill department showing single-stand mill in foreground and two tandem mills at upper left.

has been expanded by the installation of a modern 45x80 in. reversing universal slab mill, capable of handling ingots up to 45,000 lb. and rolling slabs up to 8x60 in. x 30 ft. long. Because of furnace limitations, the maximum length of slabs furnished to the Irvin plant is 18 ft.

These slabs are stored in the 64,000-ton slab yard at the north end of the Irvin Works, adjacent to the 80-in. continuous hot strip mill. Slab conditioning beds with special facilities for removing surface imperfections by oxyacetelyene scarfing are provided at each end of the slab yard. Three continuous zone controlled, triple-fired slab heating furnaces are installed to assure an ample supply of hot slabs for rolling. Both ends of the furnace approach table are equipped with magazine feeders. Each furnace is equipped with two motor-operated slab pushers. A slab return conveyor is installed at the end of the mill approach table.

The accompanying table No. 1 lists the principal equipment installed in the continuous hot strip mill procedure. The two coilers on the hot mill line discharge to short conveyors which transfer the hot coils to the 1270 ft. cooling conveyor. Down tilters discharging both right and left about midway down this conveyor line deliver coils to the raw coil storage rooms. A third down tilter is provided at the end of the conveyor line. Two 20-ton cranes, 120 ft. span, cover the main raw coil storage building, a third similar crane delivering raw coils from this storage building to the pickling lines.

The hot strip mill finishing department lies between the raw coil storage rooms at the end of the 80-in. hot strip mill and the cold reducing finishing department. Provision is made for handling either strip or sheet as it comes from the 80-in. mill. Equipment in the hot strip mill finishing department consists of flying shears, resquaring shears, temper mills, recoiling and side trimming lines, with a sheet pickler and scrubbing lines. Conveyors and transferring equipment have been installed so that the products of this department can be diverted to the various processing units with a minimum of handling.

Coils for cold reduction pass through either of two continuous pickling lines in the raw coil pickling department. This section of the plant connects to the South end of the raw coil storage building and extends east to the cold reduction department. One pickling line is designed to handle

Tin shear line, maximum speed of line is 500 f.p.m.

TABLE NO. 1
IRVIN 80-IN. HOT MILL

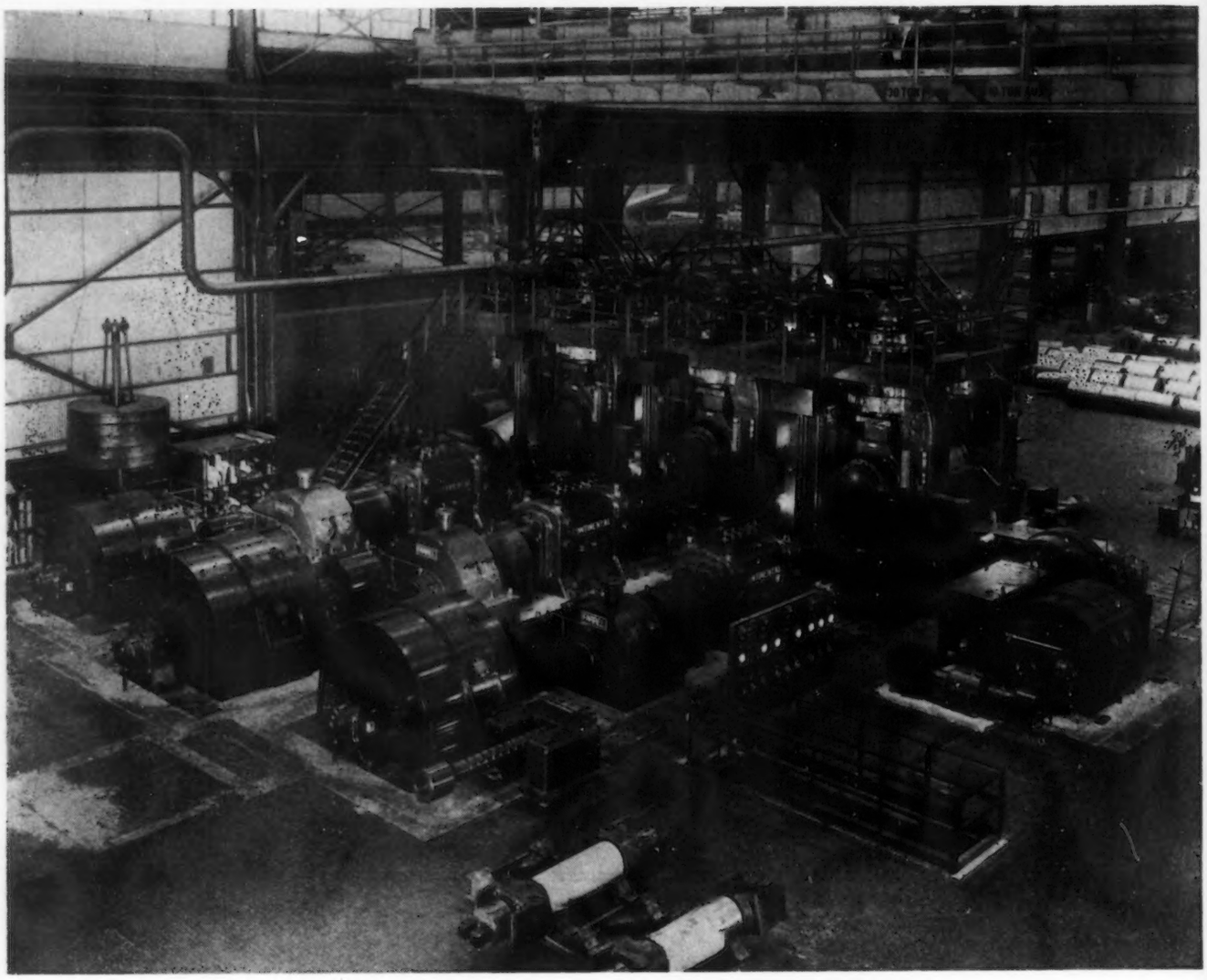
Equipment	Remarks
No. 1 Scale Breaker	Two-high, 36x66 in., 1250 h.p. a.c. motor, 1350 lb. water sprays.
Spreading Mill	Four-high, turntables, 38x130 in. work rolls, 51x124 in. back up rolls, 3500 h.p. a.c. motor.
Squeezer	Hydraulically operated.
No. 2 Universal Roughing stand	38x81 in. work rolls, 51x76 in. back up rolls, 3500 h.p. a.c. motor.
Nos. 3 and 4 Universal Roughing stands	38x81 in. work rolls, 53x76 in. back up rolls, 3500 h.p. a.c. motor.
Rotary Crop Shears (2)	Front and tail crops may be sheared off as required.
No. 2 Scale Breaker	Two-high, 25½x80 in., 500 h.p. variable speed motor.
Six Stand Finishing Train	Six four-high stands, 27x81 in. work rolls, 53x76 in. back up rolls; numbers 5 and 6 stands driven by 4500 h.p. motor; stands 7, 8 and 9 driven by 5000 h.p. motor and stand 10 by 2500 h.p. motor, all being d.c. as are motors on run out table.
Rotary Flying Shear	To square up head end of strip or cut sheets to length. Strip leaves last finishing stand at speeds ranging from 1000 to 2000 f.p.m.
Run Out Table	Approximately 700 ft. long. Two coilers located about 380 ft. from last finishing stand.

Capacity of mill—600,000 gross tons annually

NOTE

Slabs are furnished to Irvin mill by Edgar Thomson Works, located six miles away. A new slabbing mill was provided for this purpose.

Slabbing Mill	45x80 in., driven by 5000 hp. motor. Vertical rolls, also part of slabber, measure 36 in. in diameter and are driven by combination of beveled gear and single helical spur gears. Both rolls driven by 3000 h.p. reversing motor. Will handle ingots weighing up to 45,000 lb. Annual capacity over 1,000,000 tons.



Drive side of 84 in. three-stand tandem cold reduction mill.

TABLE NO. 2

IRVIN COLD REDUCING TIN MILL DIVISION

Equipment	Remarks
Tandem Cold Mill	Five stand four-high, 20½x53x42 in., rated capacity 100,000 gross tons annually, 600 h.p. motor on first stand, 1500 h.p. motor other four stands. Strip speeds range from 600 to 1565 f.p.m. Will handle stock 16 to 38 in. wide and in gages 14 to 30.
Reversing Cold Mill	Four-high, 20½x53x54 in., 3500 h.p. motor, strip speed ranging from 500 to 1100 f.p.m.
Three Electrolytic Cleaning Lines	
11 Gas Fired Annealing Units	36 bases designed to handle 16 coils per base when stacked two high.
Annealed stock is delivered by transfer car to tin temper mill department.	
Three Temper Pass Mills	Two are four-high, two stand, 18x42½x42 in. and one is four-high single stand, same size. Strip speeds range from 600 to 1500 f.p.m., tempering strip from 16 to 38 gage.
Six Flying Shear Lines	Four have shears of reciprocating type and two have drum type shears. Products are automatically gage assorted.
Strip goes from shear lines to batch type white picklers and from there to tin house where 14 hot dip pots are installed. Five of the tinning machines are 75 in. and the other nine are 64 in. units.	

strip up to 38 in. in width and the other will take coils up to 77 in. in width. Gravity type conveyors receive the pickled coils from the recoilers and take them to a point from which tractors deliver them to the cold reduction department or storage as required.

Here the flow lines split, part of the material swinging to the tin mill and part to the cold reducing sheet division.

Table No. 2 lists important equipment and remarks pertaining to the cold reducing tin plate division.

Returning to the cold reduction department, we find additional equipment for the processing of pickled coiled stock as listed in table No. 3.

Every care has been exercised to assure maximum safety throughout the entire plant and special provision has been made for the comfort and convenience of the workers. Pickling,

electrolytic cleaning, and tinning lines are covered or hooded to eliminate steam or fumes.

The Irvin Works, considered in connection with the recently installed new blooming mill facilities at the Edgar Thomson Works situated six miles north of Irvin and connected by the corporation owned Union Railroad, represents a major modernization move to integrate completely the company's flat rolled production in the Pittsburgh district and incidentally rounds out a similar program started some time ago among the larger subsidiaries by the U. S. Steel Corp.

TABLE NO. 3
IRVIN COLD REDUCTION DIVISION
(For Sheets and Strip)

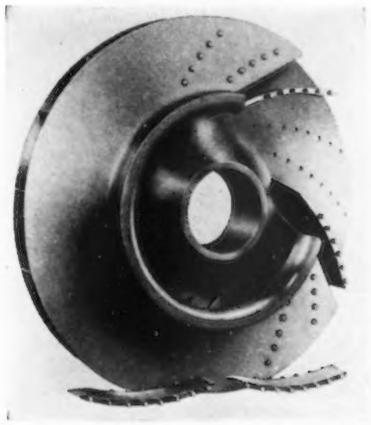
Equipment	Remarks
Tandem Cold Mill	Three stand, 20½x56x84 in., capacity 200,000 gross tons coiled strip annually. No. 1 and 3 stands are driven by 2500 h.p. motor and number 2 by 3500 h.p. motor. Delivery speeds range from 450 to 900 f.p.m. Mill will handls coils from 18 to 77 in. in width.
Recoiling Line	Side trim strip 16 gage or lighter.
Three Flying Shear Lines	For strip 18 to 77 in. wide, 11 gage or lighter. These lines equipped with two-high roller levelers, side trimmers, and drum type flying shears. Strip cut in lengths 30 in. to 15 ft. at speeds of from 150 to 450 f.p.m.
34 Muffle Type Gas Fired Annealing Furnaces	Controlled atmosphere annealing type with 118 cases and hoods. Two of these furnaces handle coils up to 54 in. o.d. and widths up to 77 in. Remainder of furnaces designed for sheet annealing.
Three Temper Mills	Four-high, 20½x48x84 in. Two of these mills are arranged for coils or sheets and one for sheets alone. Speeds range from 150 to 450 f.p.m. Two-high roller levelers are in tandem.
Temper Mill	Two-high, 32x84 in. for sheets or coils with two-high roller leveler.
Supplemental Equipment	Additional roller levelers, stretcher leveler, squaring shears, oil machine, flying and resquaring shear lines and combination open annealing and normalizing furnace.

Construction Details of Built-Up Impellers

INTERESTING details of construction have recently been revealed about the high speed chrome-vanadium forged steel built-up impeller wheels for Allis-Chalmers turbo-blowers. These wheels are of the inclosed, or shrouded type, with blades curved away from the direction of rotation. The hub disk and cover disk are machined from single piece forgings of chrome-vanadium steel, heat treated to give the maximum strength consistent with proper ductility. After being machined, the disks are drilled and countersunk to receive the rivets.

The blades are of forged, heat-treated chrome-vanadium steel plate. The plate is cut to rough size with the grain of the metal across the blade. The blades are milled out on the sides, leaving material from which to form the rivets as an integral part of the blade. After machining, the blades are bent to shape cold, then riveted to the hub and cover disks.

The riveting is done cold, with special hand tools which insure that the rivets cannot become misalined.



After riveting, the outer surfaces of the disks are machined to remove excess rivet material so that the heads are not subject to erosive action.

Before the Allis-Chalmers blower impellers are assembled, the blades are weighed on a special scale, at the diameter at which they will be located with respect to the centerline of the rotor. Blades of equal moments are placed opposite each other in the wheel. After completion, each wheel is balanced both statically and dynamically, and is given an overspeed test.

For special applications, stainless steel can be substituted for chrome-vanadium steel.

Systematic Control of Stockroom Transactions

A FAIRBANKS Printomatic weigher in use at the Parker-Kalon Corp., 200 Varick Street, New York, provides a complete printed record of each wire and steel stockroom transaction. In addition to weight, which is automatically recorded directly from the dial and tare beam, the Printomatic records the source of supply, size of material, number of pieces, date and whether the material is incoming or is being withdrawn from stock. This additional information is set up by the operator on the designating keys, and all the data are printed on a roll tape. This tape is used in maintaining a perpetual inventory and the daily record goes to the purchasing department for auditing invoices of incoming shipments. The scale proper is a Fairbanks 6000-lb. all metal, warehouse scale with cabinet dial. This accurate, legible system minimizes errors and contributes to greater efficiency.

Precision Machine Tools Built

THIS article, continued from THE IRON AGE of Dec. 8, page 36, further illustrates the use of welded steel construction, in this case in the building of Cincinnati Hydro-Broach machines.

For some machine tools cast iron is the most suitable; for others particularly special or semi-special structures, welded steel construction, in whole or in part, is most economical. In between there is an important group made up of machines formerly built of cast iron but subject to change-over to welded steel as knowledge of weld fabrication increases and adequate weld shop equipment becomes available. Weld-fabrication of machines in this group depends first on its suitability, and then on its ability to equal or get below the cost of cast iron designs.

o o o

BROACHING machines — single ram, double ram, and large horizontal types—have set a new pace for production and accurate machining of plain and curved external cylindrical surfaces. Although their application is only in its infancy, a list of their users reads like a directory of the industrial mass production shops. Parts ranging from auto door safety catches broached at 1200 an hour, on up to eight-cylinder motor blocks at 60 an hour are being broached today with machines having capacities of 2 to 150 hp., respectively.

How far welding enters into broaching machine construction is worth investigating. From beginning to end the construction of these marvels of modern machinery require welding.

Fig. 19 shows what is probably one of the most nearly ideal welded machine tool beds it is possible to build from a cost point of view. It consists of two standard angles and a standard I-beam. A few ribs of ¾-in. plate are welded into the bottom and 14 supporting feet are welded on. The amount of labor per pound of material is abnormally low, yet the rigidity is everywhere it is needed and in the correct plane.

The advantages of such a design are numerous. Stock material is used and the cutting waste is very small. The component parts fit together without effort. A casting to replace this welded structure and do the same job would be difficult to cast and would be of doubtful stability over such a length, unless the depth of section is increased considerably.

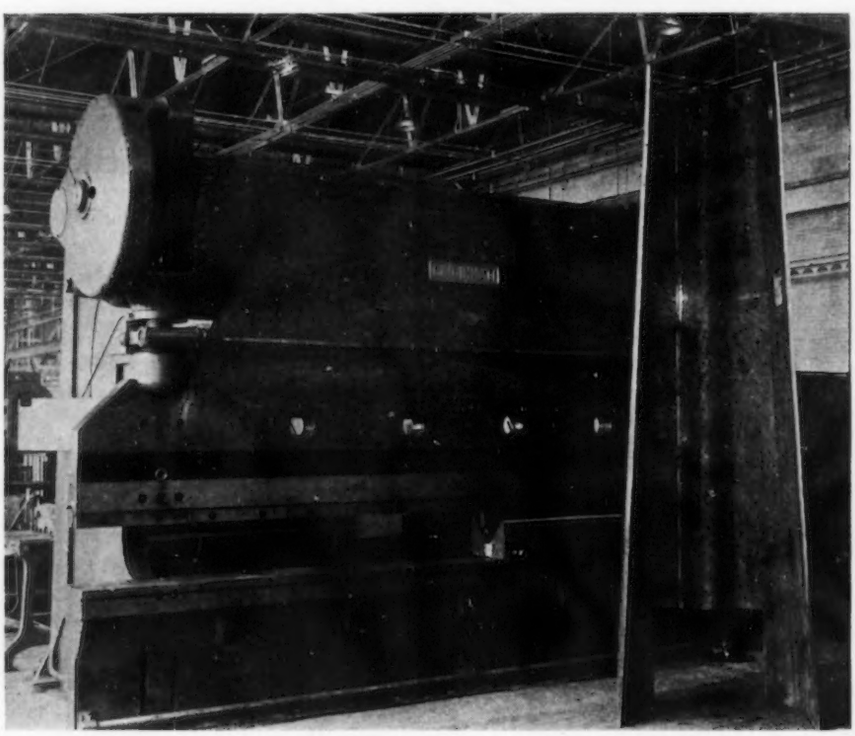
Cylinder-Block Broaching Machines

Let us consider the giant cylinder block broach. As pointed out earlier, rigidity is vital, yet these machines are 33 ft., 10 in. long. Figs. 13-19 show this machine in various stages of construction.

The rough bed after welding weighs 26,000 lb. It is worth mentioning that it is cleaned up in 3/32 in. over the entire flat surfaces. A cast-iron bed for this machine of satisfactory rigidity would weigh 39,900 to 45,000 lb.

These welded machines contain cast iron, sheet steel, steel plate, steel castings, forgings and heat-treated alloy parts; each form of metal applied where it is best suited to do the work required of it. The material chosen is dictated by its mechanical properties and the relative merits of each for the work and service that it is called upon to perform. In other words, our engineers are able to select the best material for each application.

Then there is the broach work fixture for handling and holding the block. Strength as well as rigidity is vital here, yet it must have some pretty big openings, at embarrassing places, for the cylinder blocks, piping, dust removal and operating details. In



by Welding—II---

o o o

By L. F. NENNINGER and
W. A. MADDOX

Chief Engineer and Supervisor of Welding, respectively, The Cincinnati Milling Machine Co. and Cincinnati Grinders, Incorporated

o o o

addition, the casting of the fixture would be complicated by the fact that each machine of this type is usually special.

In working out the operations, minor changes or rearrangements may be necessary. With steel, by the most carefully controlled procedure, we may make or enlarge openings or we can close up holes or move lugs and bosses. In other words, with welded steel fabrication we have a freedom in design and manufacture that the engineer limited to cast iron can only dream of and hope for.

Then there is the hydraulic oil piping. To make screwed fittings for work of this nature would not only be quite expensive, but difficult mechanically, if not impossible. This piping is gas welded and the quality of such joints is well known. The chip troughs, oil catchers and numerous other accessories so necessary to machine tools are bent up and welded.

There isn't much question but that welded steel plays a really vital and necessary part in the construction of machine tools.

What Determines Use of Cast Iron or Steel

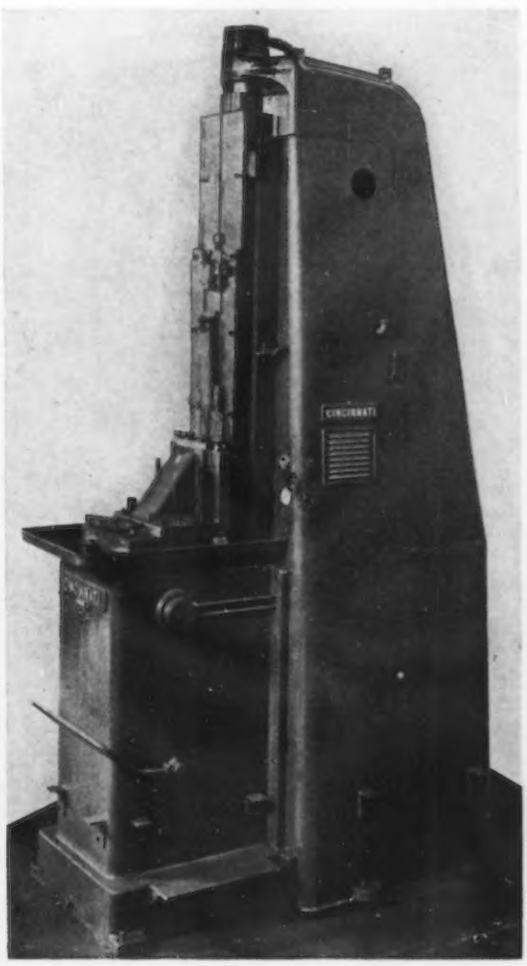
There are many reasons why we should use welding in machine tools, but they all boil down to just one: namely, that it is good, very good economics to weld certain types and classes of machine tools and details.

There are machines whose inherent design features are such that cast iron is the proper material for their construction. This group includes machines built in large quantities and intricate in nature. Here cast iron is so completely suitable that other materials are not competitive in their present state of development.

At the other extreme are special or semi-special structures which we cannot afford to cast for any of the numerous reasons stated in this paper.

But the most important group of all, consists of the border line cases which were cast iron and which we have been changing over to steel as our knowledge and equipment expands. Strange to say, this last group is far more important to the welding shop than those machines that are definitely steel structures. The reason for this apparent abnormality is that without obtaining much of the load for the weld shop that this competitive group carries, the weld shop and its personnel is seriously handicapped by two conditions. First and most vital is the lack of equipment. With a minimum of equipment a fabricating shop can build a machine tool base, column or rail for 12 to 14c. a lb. On the other hand, a similar design, but one quite differently detailed and built using a reasonable amount of standard machinery such as plate shears, press brakes, punch presses, hydraulic presses, nibblers, circle shears, power cold saws and other machinery of this type, will be built for much less.

As foundry casting costs have gone up in recent years from 4 or 5c. per lb. to 6, 7 or 8c. per lb. the welded structure has become more and more competitive. While some factors have tended to increase welding costs, the actual finished cost of welded structures has been definitely on the down grade. This has been brought about by design trends and increased knowl-



AT LEFT

FIG. 11 — View of main structure of a single ram Hydro-Broach in front of the machine used to form it.

o o o

AT RIGHT

FIG. 12—Completed single ram Hydro-Broach the main member of which is pictured in Fig. 11.

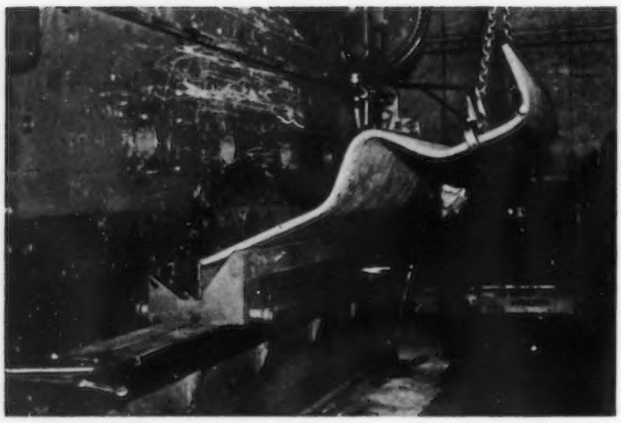


FIG. 13 — Making the last bend in the main plate for a large horizontal broaching machine.

o o o

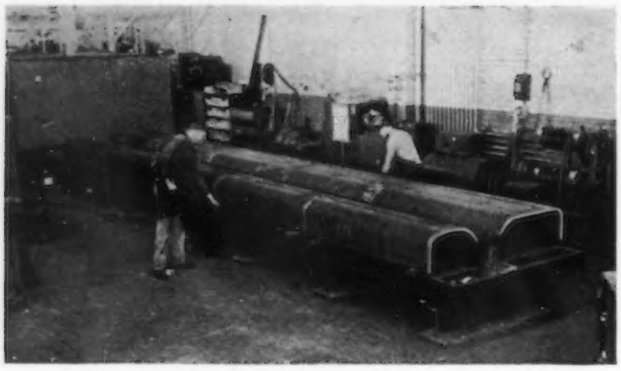


FIG. 14—Lining up the main plates of the large horizontal Hydro-Broach.

edge on the part of the engineer and the shop. The use of press brakes has been a very definite factor not only in reducing our costs but in improving the appearance of our machines.

Considering the fact that a steel structure properly designed and worked out in the shop will be 20-40 per cent lighter in weight than a casting for the same purpose, the spread in cost that has existed between certain types of castings and the welded structure has decreased and in some cases passed the equal point.

There are many different problems confronting the iron foundry today. For example, steadily rising costs due to many factors such as dust control, smoke prevention, labor problems and over-all costs. According to the May, 1938, issue of *Factory Management* labor cost runs from 20 to 25 per cent of the total cost in fabricating shops while in the foundry it runs from 35 to 45 per cent of the total costs. With the present labor trends, this becomes a really important factor. True, in the modern mechanized foundry every effort is being made to reduce these costs and above-mentioned troubles. However, almost all efforts along this line increase the overhead seriously. Thus, we have the situation wherein modern trends are working together to make steel structures more and more competitive with cast iron.

The Problem of Special Structures

In all kinds of machinery construction, there always exists the problem of special structures.

The cost of making patterns for many large special structures, where only one or two will be required, is prohibitive. The delivery of a steel bed machine will be two to four weeks better than the cast-iron machine. The pattern alone will take as long or longer to build than the welded steel structure and cost as much or more. The cooling in the pit adds about another week to the time required. To put it another way, we have found that the large welded bed can be completed by the time the shop can build the important sub-assemblies. The bed would be in one piece and would be some 20 to 40 per cent lighter than the equivalent casting. The casting would be made in two or more pieces so as to fit into flasks or else it would be a pit job with all the trouble that entails.

When a steel bed is welded we know it is going to be all right the first time. There will be no core shifts, no hard spots or spongy iron. With a large special casting, the problems start when the pattern foreman begins

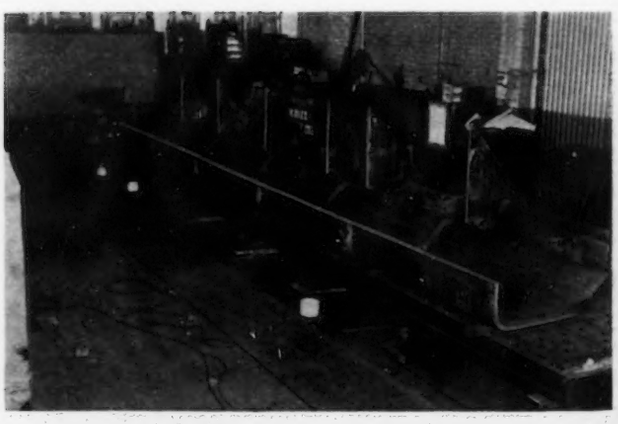


FIG. 15 — Upper set of ribs installed on large broach.

o o o

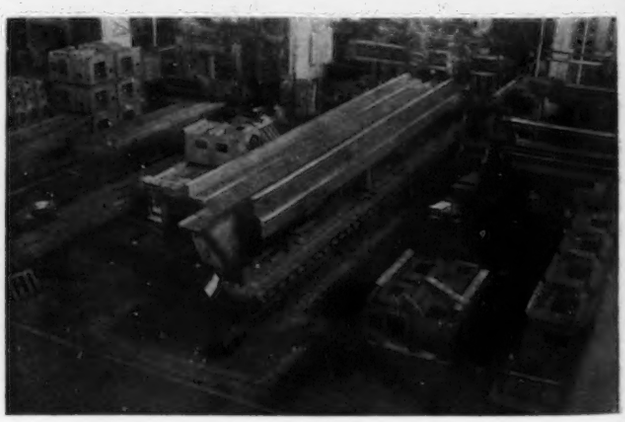


FIG. 16—Machining the bed of a large cylinder-block broaching machine.

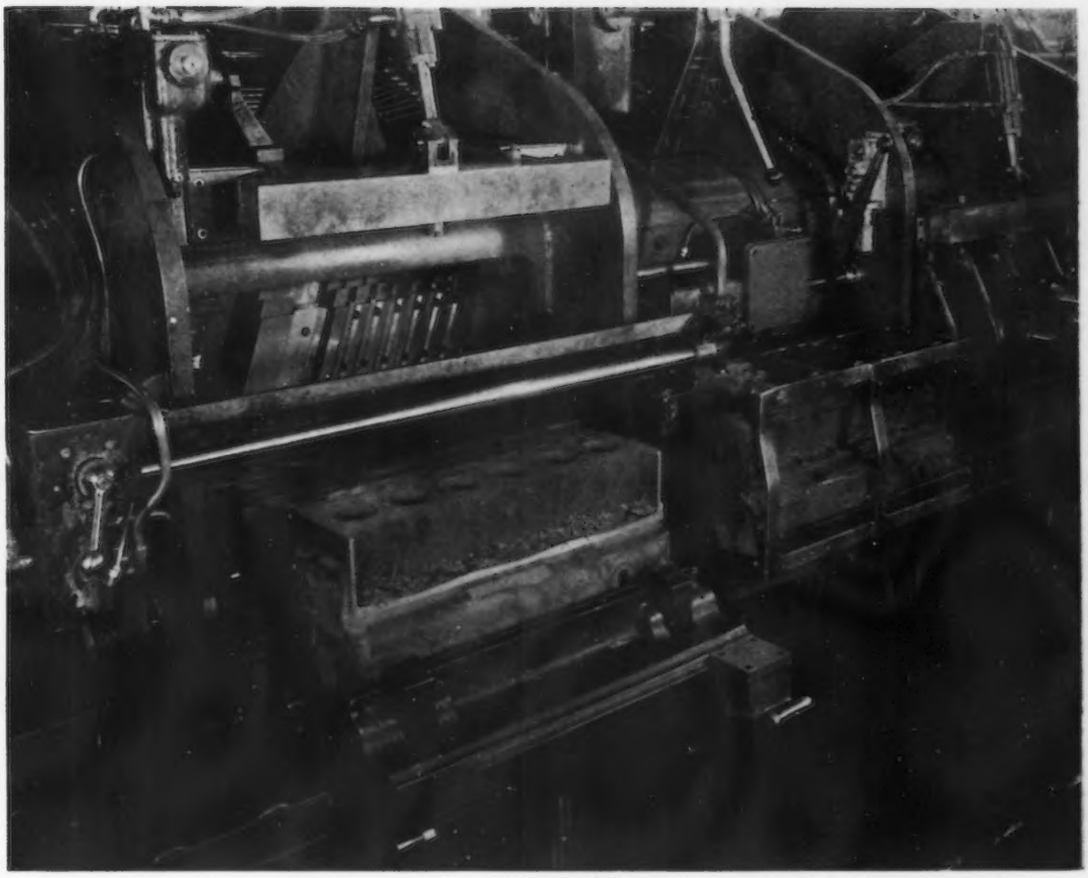
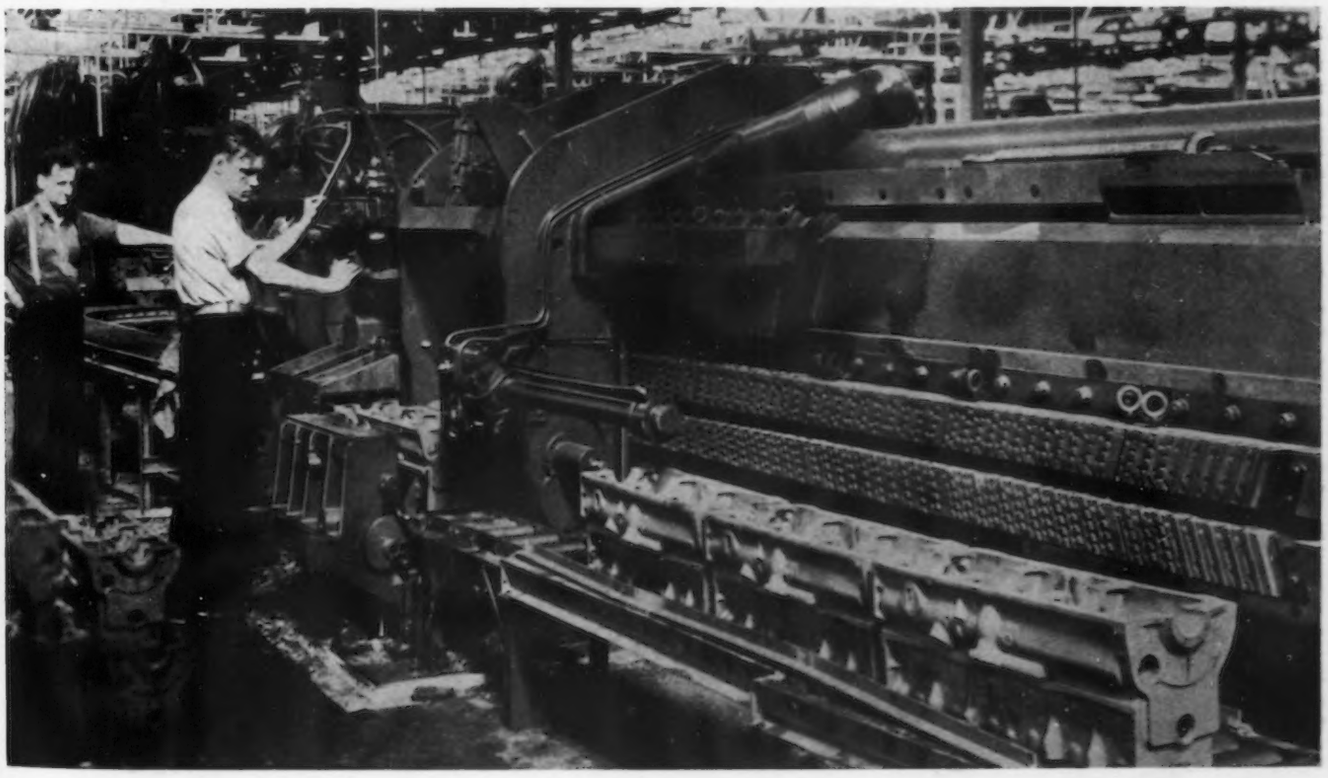


FIG. 17—Fixture in use on cylinder-block broach.

FIG. 18—Complete Cincinnati horizontal Hydro-Broach broaching machine in operation on cylinder blocks.



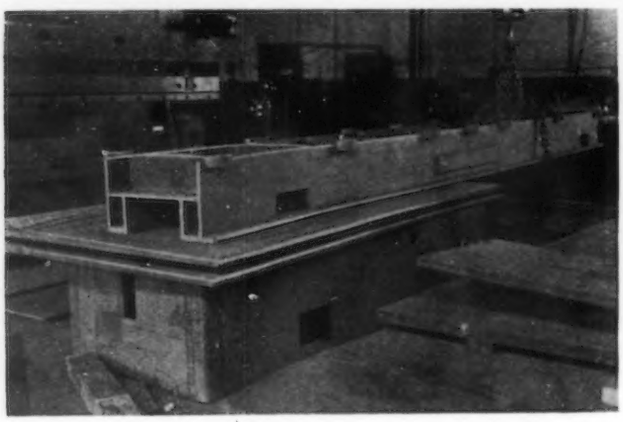
to study the drawing. Quite a bit of engineering shop contact is necessary even before the pattern is made. The foundry superintendent and foreman have to work out the risers, the gating, special vents and the rigging to hold the top down on the pit jobs. After the pattern and cores are made, an excessive amount of supervision is necessary in order to put the mold together. Generally a contact man from the pattern shop is required to help set the cores. After pouring the casting, it is necessary to wait three days to a week for it to cool before digging it out of the pit. With the cores inside, it may be too heavy for the cranes to lift out of the pit. If the casting is bad, nearly two weeks is lost on the delivery.

Naturally the percentage of scrap and rejects on large special castings will be higher than on standard ones. When the cost of the scrap is distributed over the special castings required, the advantage of welding such structures becomes more apparent.

In other words, given the proper machinery and tools which are recognized as the correct equipment for processing the steel, the welding shop will produce machine tool structures which should be welded, at a cost which will be competitive with cast iron. Then, with the cost in line so that the economics of the weld shop justifies a larger percentage of the borderline load, a large enough organization will be established so that when special machines that must be made of steel come along, their construction can be completed quickly for the short delivery which is so desirable on special machinery. The cost will then be little more than on standard machines and well below the cost of structures, built with the minimum of equipment.

There is another aspect to this problem which is often overlooked. With a steel structure we have the flexibility of being able to make preliminary tests and minor changes to meet new or unanticipated changes in the part being machined for, or in the machine tool structure itself. Plates, braces, ribs, passages, details of all kinds may be added where they are needed. This flexibility, this freedom in construction, is especially valuable on jobs where there is no time for models or extensive pattern developments. It makes special machinery more economic where standard equipment would do, but is not wanted for any one of many reasons.

In some special cases the problem of anticipating all the conflicts and interferences of the component parts is so difficult that even on standard machines it is good economics to build the first few parts or machines of steel. After all the bugs are ironed out, first class pattern equipment can be built with confidence, knowing that it won't be ruined by changes here and there. While such a condition is not prevalent, it does happen and this approach to the problem certainly expedites the getting into production with the minimum expenditure of time and money.



o o o

FIG. 19—This weld-fabricated bed for a giant cylinder block broaching machine consists of two standard angles and a standard I-beam. Simplicity and low cost are among the advantages.

o o o

Design Advantages

Knowing steel and cast iron as we do, knowing the advantages and limitations of each, realizing that each must be properly applied if we are to give the customer the best possible machine for his work at a reasonable price and at the same time make a profit, we know that the direct result of changing from cast iron to proper design and construction of steel results in either reducing weight or increasing rigidity, whichever the designer chooses — usually he desires both.

It should not be overlooked that with steel, the engineer does not have to thicken up a wall here or modify a corner there or compromise in another location, all for casting reasons. He does not have to worry the whole time as to whether he is going to get a good casting the first or even the second or third trial on some difficult structures. He knows that if some structural problem does develop, the cutting torch or arc welding rod will solve it for him. He knows that the strength and ductility of weld-metal today is such that he can depend on this structure not failing in the welds. Of course, the welding practice, the same as the foundry practice, must be right in every sense of the word. The supervision must be trained, and with the proper background of good mechanical knowledge. The welder cannot be just the first individual who comes in looking for a job. Many times even good welders must be checked up and guided in their work, to keep the quality of their output the best.

When we take the long range view of the question of welding as applied to machine tools, we realize that there will be opportunities to build machines which will be reasonable in cost and at the same time that will match the performance of equipment built with cast iron. Therefore, the use of welding in future constructions depends largely upon mechanical suitability of the material for a particular application and its ability to equal or get below the cost of cast iron designs.

BELOW

SEAMLESS drawn stainless steel tubs are now being made by Geuder, Paeschke & Frey Corp., Milwaukee, for the Speed Queen electric washers made by the Barlow & Seelig Mfg. Co. Allegheny-Ludlum Steel Corp. assisted in the development of this tub, said to be the first made of stainless steel.

Factory-Built Steel Houses in Production

By HARRY WILKIN PERRY

o o o

THE steel houses shown herewith are the result of 20 months of experimentation and improvement by R. G. LeTourneau, Inc., of Peoria, Ill., which has been engaged for 15 years in the manufacture of mobile earth scrapers and graders. In the experimental period more than 30 houses were designed and built successively by progressively improved methods and were rented to and occupied by employees of the company whose experience in living in them provided useful ideas for improvements in design and construction. Now the company is satisfied that the houses built to its present designs and by its latest methods are right for sale to home buyers.

They are offered in three, four and five-room standard sizes and floor plans, but the manufacturing system is flexible and permits of building other sizes and designs and also private garages, summer cabins, barns, tourist cabins, storehouses and the like. The three-room house is 24 ft. square. The four-room 27 ft. 5 in. square, and the five-room 27 ft. 5 in. by 31 ft. 3 in. at the widest part. They are of strong but light-weight construction and are thoroughly insulated against heat and cold. When properly grounded to earth they are effectively protected against lightning.

In the manufacturing process, 48 in. x 94-in. sheets of 12-gage steel having a tensile strength of 55,000 to 65,000 lb. per sq. in. are stamped under 600 tons pressure into sunken panel design and in the same operation the four edges of each sheet are pressed down at right angles to form 1-in. flanges. The sheets are then coated on both sides with non-corrosion paint. A pair of these sheets, with the flanges to-

ward each other, are electrically welded to interior steel spacers set at intervals of not more than 2 ft. and to pressed-steel trusses placed just inside the edges and against the flanges. The result is the production of standard hollow panels 46 in. x 92 in. Half-size panels are made in the same way. The panels are made in three thicknesses: 6 in. for floors; 4 in. for walls, partitions and ceilings, and 9 in. for use where plumbing and electrical connections are to be installed. Under test, the panels support a weight of 100 lb. per sq. ft. without measurable deflection.

These panels are then built into a one-piece house structure by arc-welding them together at the flanged edges. As floor, wall, partition and ceiling sections are built they are filled with rock wool to a density of 10 lb. per cu. ft. This insulates the house as a whole and each room individually against heat transfer and noise and is proof against fire, water absorption, decay and insects. The flanged joints give rigidity to the floors, walls and ceilings and are water-tight. There are no cracks to catch and hold dirt or leak air, and there can be no warping and shrinking as in wood structures. The water-tightness was well demonstrated when a six-room house was floated on its own bottom across the Illinois River, towed by a tug, from the factory on one side to the farm of the company head on the opposite side.

Floors are covered with three coats of plastic material which is both fire and water proof and is available in seven colors and shades. Walls and ceilings are sponged over the non-corrosion paint with ivory stipple paint, and kitchen and bathroom are given a coat of enamel. The walls therefore can be washed without damage. Exterior walls are spread with a standard outside paint and, while wet, are sprayed uniformly with even-textured sand, followed by a second coat of selected color. Two coats of waterproofing asphalt are applied on the roof.

Equipment of the houses includes an oil or gas-fired air-conditioning heating and cooling unit, modern enameled-iron and chromium-plated kitchen fixtures, a 2000-watt electric water heater and 30-gal. insulated tank, enameled-iron bathtub and wall lavatory with chromium-plated fixtures, vitreous-china toilet and flush tank, and six-circuit electric wiring with outlets in all rooms for lighting and household appliances — water-heater, air-conditioner, cooking range, radio, vacuum cleaner and even electric shaver.

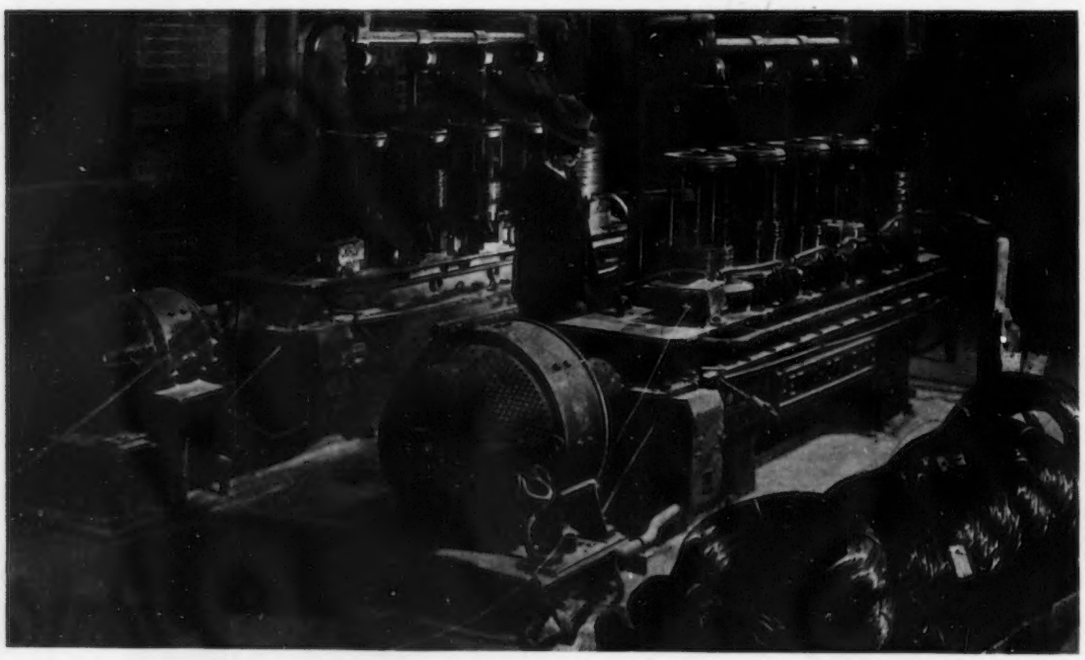
Prices of the houses, f.o.b. factory or delivered and erected within 100 miles of Peoria, are $4,500 for the three-room, $4,700 for the four-room, and $5,000 for the five-room.

Wire Drawing Controlled By Water Cooling

SPRING wire with a combination of high tensile strength, exceptional resistance to fatigue and uniformity to gage is now being produced on a new type of wire drawing machine, first of its kind, installed by the Jones & Laughlin Steel Corp. The chief innovation on these machines, which are of the general Connor type made by the Aetna-Standard Engineering Co., is a water cooling system used to control the heat generated in the drawing process. Another mechanical change is that the take-off wire is overhead rather than through the block center, making easier threading and simplifying transmission.

This control of heat generated in metal by cold working is becoming increasingly important in the attainment of exceptional physical properties and uniformity of size in spring wire. Since in these low temperature ranges the time element is more important than actual temperature, the artificial cooling of the wire during working not only serves to suppress the heat, but is designed primarily to curtail the duration of the critical heat.

The effectiveness of this cooling feature is demonstrated by the fact that on the finishing block, No. 19 wire at 400 ft. per min. is cooled so fast that no more than three or four wraps at the block fillet have any sensible warmth.



o o o

HEAT generated in the drawing process is controlled by a water cooling system in these new Aetna-Standard machines installed by Jones & Laughlin, said to give a superior spring wire.

o o o

Vibrating Screens and Conveyors

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

CHAPTER 33 in a Series on the Methods and Equipment of Industrial Materials Handling.

THE vibratory principle is employed successfully for three different handling operations on bulk materials: 1—to separate and clean various sizes of material; 2—to feed material to other equipment, and, 3—to move hot, corrosive or readily clogging materials evenly and at predetermined rates of flow, continuously forward. The vibrating motion may be caused either mechanically, or electrically, and the frequency and amplitude of the vibrations may vary in accordance with the purpose to be attained and the physical characteristics of the material handled.

The feature which distinguishes vibratory equipment from other types of handling apparatus is the fact that there is no definite forward motion of the equipment to accompany the load. Except for roller conveyors, all other handling equipment moves with the load, and even in roller conveyors there is a continuous forward motion of the top surfaces of the rollers, even though the rollers themselves remain in fixed positions. In vibratory equipment the back and forth movement is so rapid and of such low amplitude in any case that it differs completely from the movement of any other type of handling equipment. But it is this particular motion which enables vibratory apparatus to do things virtually impossible for any other mechanism.

A sharp distinction should be made between "shaking" and "vibrating," although essentially they may be regarded as alike. "Shaking" as applied to mechanical equipment, is a motion of slow frequency and large amplitude; "vibration" is a motion of high frequency and small amplitude. There is little to choose between a shaking screen and a revolving screen; both work equally well in separating large sizes from small particles of noncaking bulk materials of fairly ponderable mass and weight. Vibratory equipment, however, will do anything that shaking equipment will do, and many things besides. In this discussion only true vibrating equipment will be considered.

Vibration may be imparted to a body that is fixed in position by two means. Mechanically it is generally accomplished either by the centrifugal effect of an unbalanced weight attached to a rotating shaft, or, more usually, by transmitting the reciprocating motion of a collar surrounding an eccentric on a rapidly turning shaft. Electrically it is generally accomplished by attaching the shaking deck to

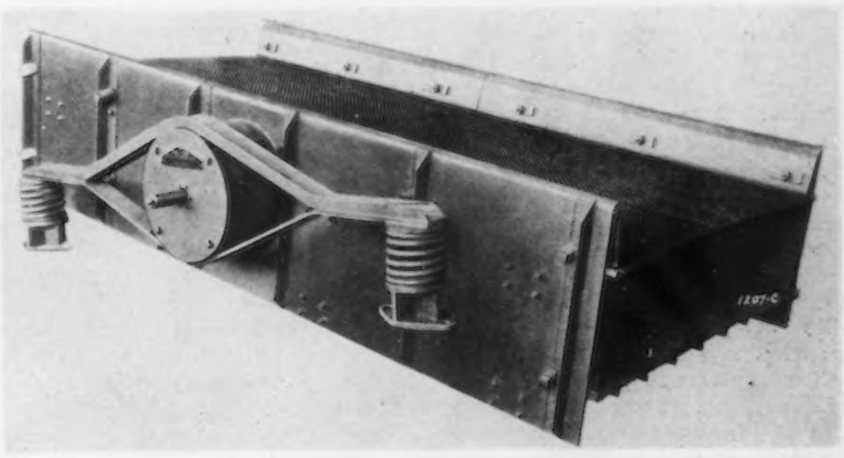


FIG. 1—Double deck Robins vibrex screen, mechanically operated and adapted for fine sizing and intermediate screening of lighter materials.

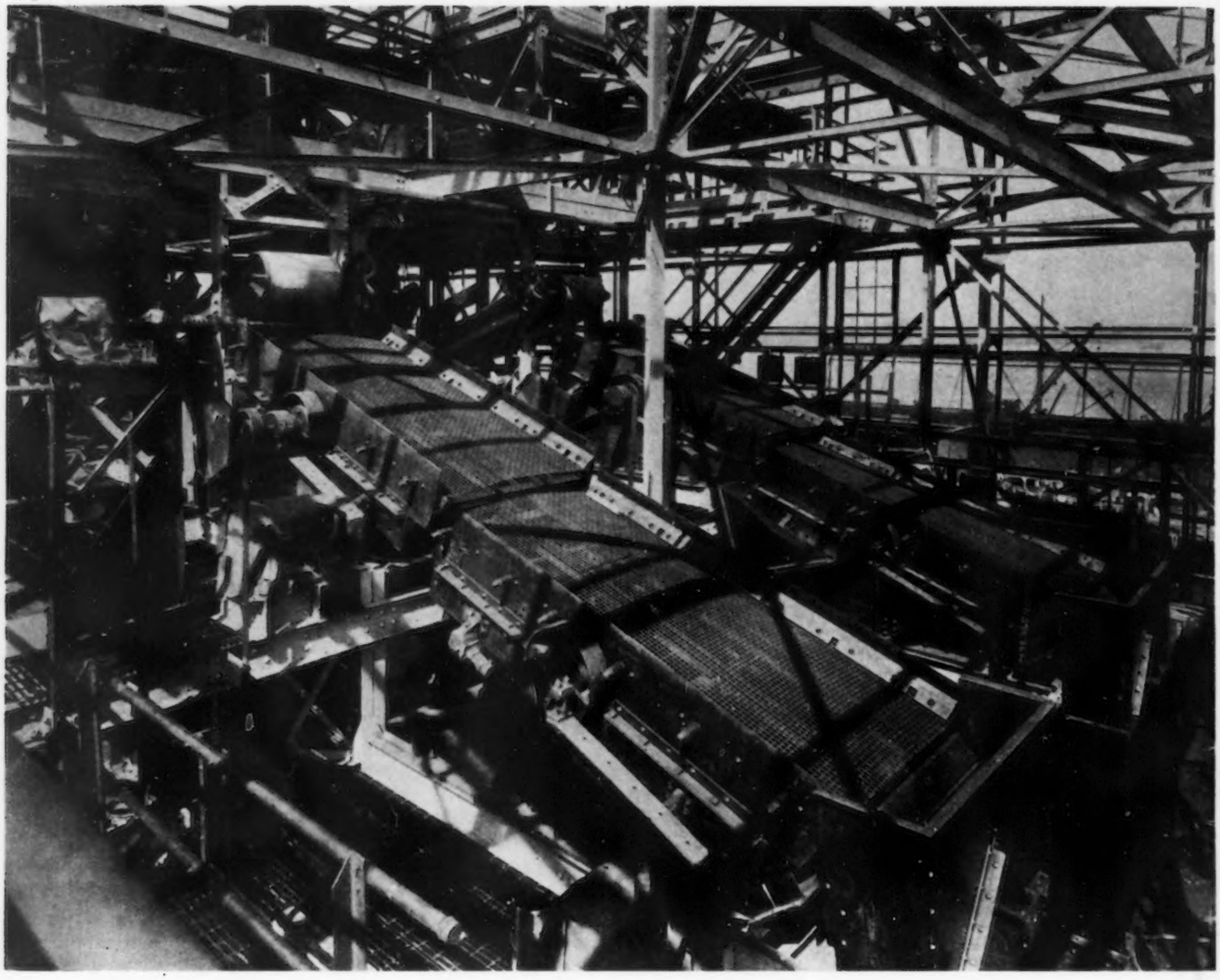


FIG. 2—Four single deck Robins gyrex screens installed in a domestic coke plant and each receiving a feed of 52 tons per hour.

o o o

the armature of a vibrating electric motor. In either case the motion imparted is constrained within close limits; the free vibrations are damped by the rigidity of the supports of the structure, and are thus caused to be of high frequency and low amplitude. All mechanical vibration is, generally speaking, of lower frequency than electrical vibration.

Regardless of the amplitude of the motion given to the equipment, it is the factor of frequency that differentiates vibration from mere shaking. A great deal less power need be expended on a light driving hammer operating very rapidly to send home piling, than on a heavy, slow-acting hammer. A quick series of light taps will more thoroughly "pack" a barrel of flour than a number of slow, heavy blows. Likewise *vibration* will more readily separate or convey fine, sticky powders than mere *shaking;* and with a lower expenditure of power. An acceptance of these facts has caused the rapid development within recent years of many lines of vibrating equipment, as an outgrowth of former shaking equipment.

Vibrating Screens

Vibrating screens are used to separate small sizes of bulk materials from large sizes, and for cleaning the materials. The screens are always set at an angle so that unseparated material flows onto them by gravity at the high end, and the material which is too large to drop through the meshes of the screen passes off at the lower end in a continuous stream. The angle at which the screen is set, and the rate of flow to the high end, are adjusted so that as much separation as possible is accomplished as the stream passes along. Too steep an angle or too rapid a feed will result in some of the small sizes of the material passing off at the lower or discharge end, instead of dropping through the mesh of the screen. The screen equipment may be single, double, or triple deck, according to the number of operations or fineness of the result desired; the coarser screens being above, so that the final, lower operations grade the smaller particles.

The preparation of sized bulk materials daily becomes more exacting. No longer can poorly sized materials find ready markets. Under the pressure of more precise specifications the standards of sizing are becoming more strict. As a consequence, no one screening device is a panacea for all screening problems.

The solution of any screening problem must be based on some certain objective. To keep the particular objective in view, to know the proper relation of the physical characteristics of the material to the screen required, and to be aware of the practical

limitations of each type of equipment, is to approach the economic problem involved with open eyes.

The five principal objectives or purposes of screening are scalping, sizing, by-passing, rescreening or dedusting, and washing. Not all of these operations apply to every screening problem.

Scalping removes merely the large or oversize particles, and does not call for close sizing. From 85 to 95 per cent of the material handled passes through the mesh of the screen. It is usually regarded as a rough, preliminary operation. Often it can be satisfactorily accomplished with stationary grizzlies, perforated chutes, or revolving screens. In the heavy industries it consists of removing fines ahead of primary and secondary crushing, or of removing waste or unsuitable material. In the chemical process industries, it is normally used to remove foreign or improperly processed material, as well as oversize material ahead of fine reduction and processing.

Sizing produces one or more products graded or classified as to size. In this operation it is considered well to pass about 60 per cent of the material handled through the mesh of the screen. Sizing is screening in the true sense of the word. Screens were originally designed and developed for this duty. Generally sizing screens are applied to one of the following operations; the preparation by grading of finished material, the elimination of oversize or undersize particles from a finished material, the separation of a valuable from a waste material, the sizing of material for the next step in processing or treatment, or sizing in a closed circuit for crushers, grinders ball or tube mills, air-separators, or classifiers.

By-passing prevents further reduction of fine material, or eliminates a part of the load which would otherwise go to the reduction equipment. It usually passes an average of but 5 to 20 per cent of the load through the mesh of the screen. For best results the screen should be one that will agitate a heavy burden of material and cause a quick release of the fines through the screen openings.

Rescreening or dedusting removes from a finished, sized product the fines

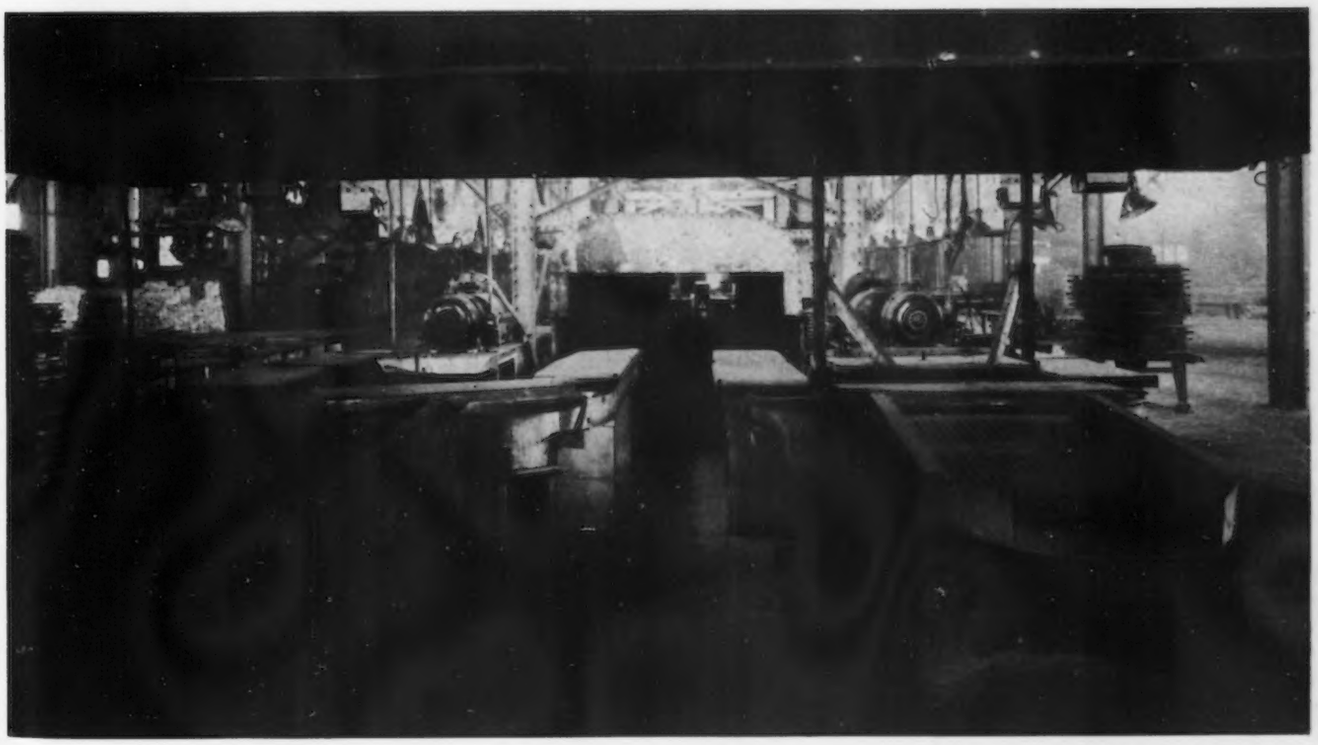
AT RIGHT

FIG. 3—Two Link-Belt double deck heavy duty vibrating screens screening the dust and fines out of small sizes in a bituminous coal preparation plant.

o o o

BELOW

FIG. 4 — Link-Belt vibrating screens installed at the shakeout end of a foundry production line, for separating the sand from the castings.



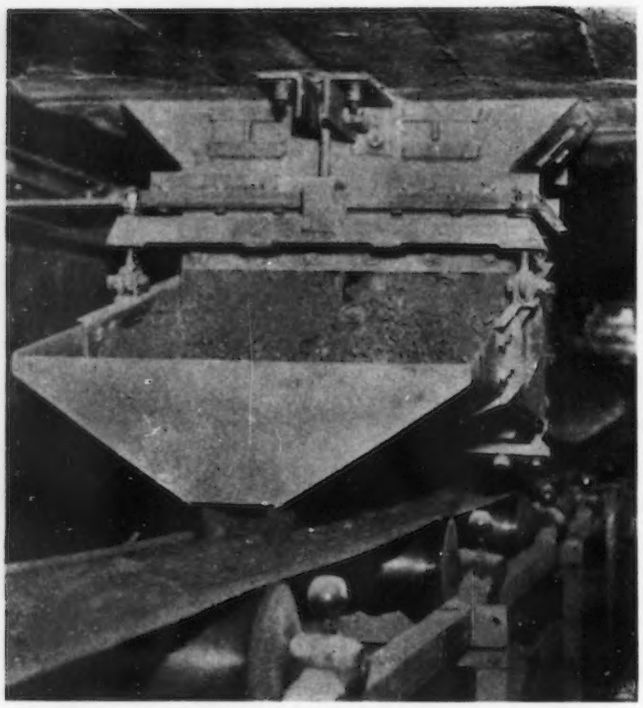


FIG. 5—Battery of Jeffrey proportioning pan vibrating feeders putting material on a belt conveyor at a large cement plant.

o o o

or dust which have been produced in the final processing, handling and storing operations. It is not considered good practice to combine rescreening with a sizing operation, as the combination is usually both expensive and largely impracticable.

Washing is a final screening operation, resorted to when rescreening does not clean the material sufficiently. It may be done with either water or air, and the basic purpose is essentially a finer rescreening, to remove fines or dust which adhere, in spite of agitation, to the larger particles of a finished product. Water sprays at pressure are played on the material as it passes over the screen, or air under pressure is forced down through, or up through the screen and the burden as it is being agitated.

Physical Characteristics

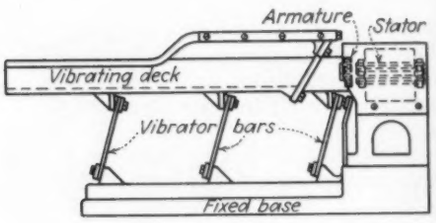
After the screening operation has been classified as to objective or purpose, the next step in analyzing the problem is to consider the relation of the physical characteristics of the material to be screened to the type of screening equipment best qualified for the operation. There are six of these characteristics which are of importance.

Materials of 35 lb. per cu. ft. density and over have fairly easy "through-screen" characteristics. Materials weighing less are normally very fine in size and are affected by other factors, so far as their ability to screen easily are concerned.

o o o

FIG. 6—The operating principle of the Jeffrey-Traylor electric vibrating feeder is here shown, as applied to a small, light duty feeder.

o o o



The shape of the particles vitally affects the screening problem. Round or spherical shapes, such as glacial sand, screens most readily. Cubical or crystalline shapes such as crushed ore or stone, coal, salt and sugar, screen less readily. Flaky or slab-sided particles tend to clog the openings, and usually require square opening wire cloth. Fibrous materials, such as woodchips, are light in density and have a tendency to cling together and mat, making them difficult to size.

Texture as a physical characteristic has little effect upon sizing except for sticky or oily conditions. Materials having a talcy or sticky texture, such as clay or sulphur, do not generally screen easily, either coating the wire cloth or actually filling the mesh. Materials having an oily or greasy texture, such as graphite, screen readily at high capacity and high efficiency.

The temperature of a material if near normal is not important, but if the material is extremely hot, such as roasted ore, special wire cloth is required. Hygroscopic materials such as salt screen more readily when warm or hot.

The moisture content of any material is a determining factor in any screening problem. Its presence in a material affects texture and therefore screenability. There are three forms of moisture: surface, inherent, and water of crystallization. Absence of moisture generally implies free screening. Moist materials tend to cling together and therefore require more vibration. Inherent moisture is only important when atmospheric conditions cause the material to sweat and acquire surface moisture. Similarly atmospheric conditions may cause materials having water of crystallization to sweat and become sticky.

Size is the final material characteristic to be considered. A careful study of this factor discloses the correct opening of wire cloth to produce the desired product, and affects capacity and efficiency.

Thus it may be seen that the problem of selecting screening equipment is not simple, but actually varies to a marked degree in accordance with what may be desired of the screening operation.

Equipment Illustrated

A double deck Robins Vibrex screen is shown in Fig. 1. This is mechanically operated. A drive shaft, running at 1800 r.p.m., carries heavy counterweights within the circular boxes attached to either side of the frame and held in yokes suspended from either end of the frame. The entire frame moves with a uniform "circle-throw" motion, especially suitable for the fine sizing and intermediate screening of such products as carbon, cement, coal, coke, foundry sand, graphite, gypsum, lime, salt, sand and gravel in small sizes, soda ash and store sand.

Robins Gyrex screens employ the more usual shaft eccentric and collar to impart a vibratory motion to the screen frame. The Gyrex screen is a more powerful big brother to the Vibrex screen, and will handle not only fine and intermediate sizing, but

also a great many coarse, heavy materials not adapted to the lighter equipment. Fig. 2 shows four single deck Robins Gyrex screens in a large domestic coke plant where a total of 24 such screens are installed. Each screen receives a feed of 52 tons per hour.

Fig. 3 is a single deck Palmer-Bee vibrating screen of simple construction employing a similar eccentric-collared shaft drive. This drive gives the entire screen frame a rotating vibrating motion with each revolution of the shaft and keeps the material always turning.

In Fig. 4 two Link-Belt double deck heavy duty vibrating screens are shown in action in a bituminous coal preparation plant, screening the dust and fines out of small sizes. Fig. 5 shows an installation of Link-Belt vibrating screens at the shakeout end of a foundry production line, for separating the sand from the castings.

o o o

FIG. 7 — Particles are projected from the deck of a Jeffrey all-electric vibrating feeder in a continuous series of rapid forward hops; 3,000 to 7,200 strokes per minute.

o o o

Vibrating Feeders

Vibratory feeding equipment is used for the purpose of insuring a continuous, even flow of material at a predetermined rate, as sugar to a bleacher, or woodchips to a macerator, or cement-clinker to a grinder. Or, coal may be so fed to a boiler furnace at a predetermined steaming rate. Whenever, in these or similar operations the rate of feed is of importance, the vibrating feeder is a factor.

Vibrating feeders are generally electrical in operation. The cyclic pulsations of alternating current cause a heavily wound stator to become intermittently magnetized and to attract an armature rigidly attached to vibrating bars which are a part of the moving frame of the feeder. At the moments when the stator is not so magnetized, these bar sections, by reason of their tension, cause the feeder frame to move away from the stator. Thus a high frequency vibration of 60 double strokes per second is induced in the feeder, at amplitudes controlled by the adjustable tension in the vibrator bars.

A typical heavy duty vibrating feeder installation is shown in Fig. 6. This is a battery of Jeffrey proportioning pan feeders putting material on a transverse belt conveyor, at a predetermined rate of flow. The operating principle of the Jeffrey equipment is clearly shown in the small capacity feeder diagrammed in Fig. 7. Equipment of this type will handle successfully over 200 different types of material varying in characteristics from dry to sticky, from damp to wet, weighing from 6 lb. to 400 lb. per cu. ft., ranging from 300 mesh powders to three foot cubes, at material temperatures from 32 degrees F. to 2000 degrees F. In various sizes, vibrating feeders will handle from less than one ton to more than 1000 tons per hour, with power consumptions ranging from a few watts to about 2 horsepower.

Vibrating Conveyors

One of the best known types of vibrating conveyors is the Jeffrey, developed from the same electric vibrating principle just described. Electric vibrators may be applied to open pan or trough, or enclosed tubular conveyor lines, up to several hundred feet long. The conveyor itself is generally a "one-piece" structure, with vibrators applied at regular intervals along the line to impart a continuous vibrating motion of high frequency and low amplitude to the whole line.

Such conveyors are particularly adapted to handle hot, gaseous abrasive sinters, calcined materials, roasted ores and chemicals, or foodstuffs, sugar, salt, sand, cullet, glass batch, etc. The principle has also been successfully applied to the charging of reverberatory furnaces.

The same principle is frequently used in vibrating coolers, for the cooling of hot materials by passing through them water or air, and for vibrating dryers in which hot air is blown through crystalline materials carried on a fine mesh wire cloth or on a perforated plate.

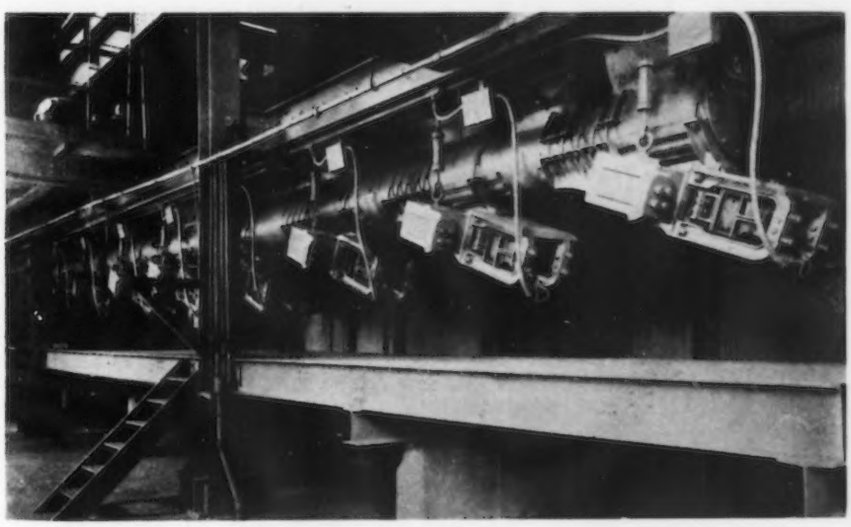


FIG. 8—20-in. Jeffrey vibrating tubular conveyor 60 ft. long handles iron sinter fines to a pug mill at temperatures ranging from 600 to 1100 deg. F.

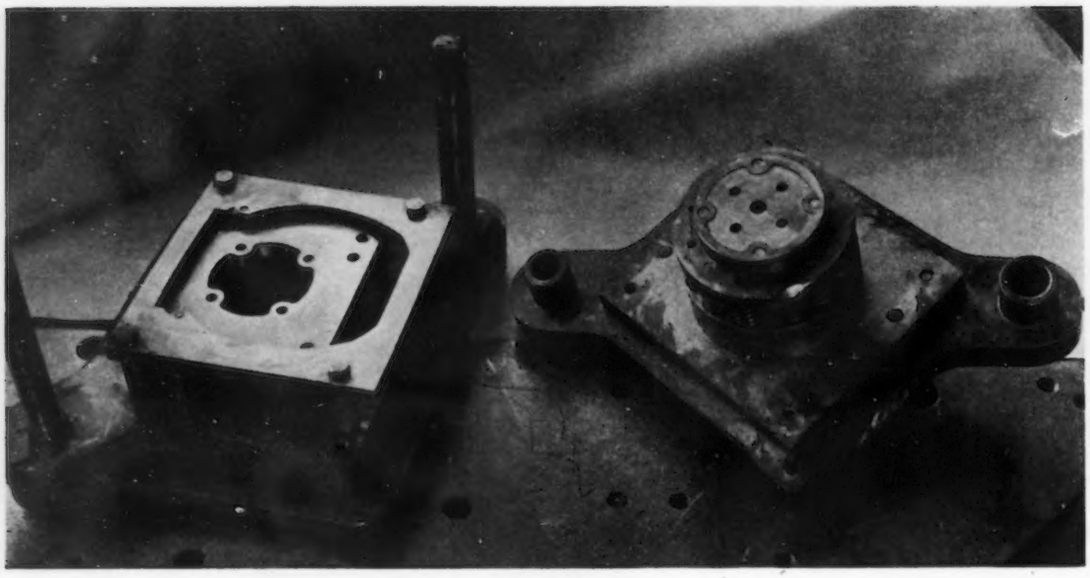


FIG. 1—A low activity class of die, used to make 40,000 stampings. The die, made of Sparta steel, measures 12x12x2 in. and the opening across the clover leaf lobes measures 7 in. Westinghouse photo.

JOBBING

SINCE the advent of the high carbon-high chrome steels more than a decade ago there have been few important developments in the field of the non-deforming die steels. In most cases users have assumed that existing grades even with some obvious shortcomings, simply represented the best that could be had. But in reality the jobbing die industry has long been in need of a new steel in the lower cost brackets which would satisfactorily take its place in the gap between the oil hardening die steels and the expensive high carbon-high chrome types, or the even more expensive high speed steels.

A short review of the factors controlling this situation will make this point much clearer. Where non-deforming properties are needed, the field has been served in the lower price class by the manganese oil hardening types or the tungsten-chrome oil hardening types of steels. In the higher price class of steels there are available the oil hardening and the more popular air hardening types of high carbon-high chrome steels or the even higher priced high speed types. Since the broad advantages and disadvantages of these classes are similar it is informative to compare the manganese oil hardening type with the air hardening high carbon-high chrome type.

The manganese oil hardening steels have the obvious advantage of cost and the dubious advantage of machineability and grinding over the high carbon-high chrome types. These latter advantages are quite relative, however, since this steel is really difficult to machine in view of its expectancy of machineability from its alloy content. Its chief disadvantages lie in the fact that oil quenching is necessary to obtain the required hardness. However, oil quenching is always accompained by a definite hazard of breakage.

Since speed of cooling is an important factor in controlling distortion, oil hardening types require detailed attention to the other factors to minimize its effect. That is, there is necessary a precise and accurate annealing practice, special precautions during and after machining, and extremely slow and uniform heating rates. If most all of these special precautions are religiously observed quite satisfactory results are possible.

The air hardening high carbon-high chrome types have a cost disadvantage at the outset. They also machine with some difficulty. Even under perfect annealing conditions this grade work hardens under the tool and, therefore, recuts, when necessary, present problems. Also, under some conditions drilling and tapping are well nigh impossible, and the grinding characteristics of this steel are standards upon which complaints are based. Anything which grinds like the high carbon-high chrome grades is usually subject to considerable opposition. However, there are certain marked advantages. In abrasive life only the high speed types can challenge its supremacy. Also, because it will assume its full hardness by cooling in still air it is possible to hold distortion to a minimum. It is often used for this latter reason alone, even when extreme resistance to abrasion is not required.

Such a picture was so vigorously presented by the Tool Steel Committee of the Westinghouse Electric & Mfg. Co. at East Pittsburgh in 1935 that the Cyclops Company undertook to present a set of suggestions which might result in a grade of steel that would combine the distortion advantages of the high carbon-high chrome types with the obvious advantages of the manganese oil hardening types *without increasing* the first cost above the cost of this latter type. Three dif-

ferent compositions were suggested, and appropriations were made from the Westinghouse shop funds to purchase commercial quantities of all three suggestions for investigation.

While Mr. Howard Scott, of the Westinghouse laboratory, was cooperating with the Cyclops laboratory in a study of the physical properties of these tentative compositions, the Westinghouse shops made up and put into service regular production dies, so that the possibilities predicted by the theoretical investigation were confirmed by actual service tests without long delays in debate and coordination. Two of the tentative suggestions fell by the wayside because they did not fully harden when cooled in still air but the third carried through to a thoroughly successful conclusion. As a result there is a new grade of tool steel called Sparta, Westinghouse has a new specification known as No. 21 Tool Steel, and the general industry has a new product whose sphere of application far exceeds the purposes for which it was originally intended.

The practical application of this problem is best illustrated by referring to Fig. 1. This die measured 12×12 ×2 in. and the opening across the clover leaf lobes measures 7 in. Only 40,000 stampings from relatively thin gage sheet were required. The oil hardening types are somewhat difficult to harden safely and require grinding due to uncontrollable movement in hardening. The high carbon-high chrome steels are expensive in first cost and machineability and in addition their wear resistance is not needed. The die classifies itself into the low activity class so often found in jobbing die shops. This new grade of material is said by Westinghouse to offer die economies of from 40 to 60 per cent over either of the better known compositions available in the making of this particular lot of stampings.

Chemically, the new air hardening die steel depends on a chromium content of from 5 to 6 per cent balanced with carbon and vanadium to adjust for volume changes, plus enough molybdenum or tungsten or both to render it fully hard when quenched in still air. From 1.00 to 1.25 per cent of molybdenum alone is sufficient to accomplish this. Distortion measured after tempering has been shown to be as good or better than in high carbon-high chrome and often is remarkably better than the best to be gained with manganese oil hardening steels. General results are in the order of 0.001 in. per in., although various cases are on record, where directional properties have been favorable, of distortion in the order of 0.0001 in. per in. Such cases have permitted dies to be sent directly into production without grinding or dressing and have in several cases permitted threaded and tapped sections to screw together perfectly with only a light sand blasting treatment after the draw to remove adhering salts. The hardnesses to expect

DIE STEELS . . .

By NORMAN I. STOTZ

Metallurgical Engineer, Universal-Cyclops Steel Corp.

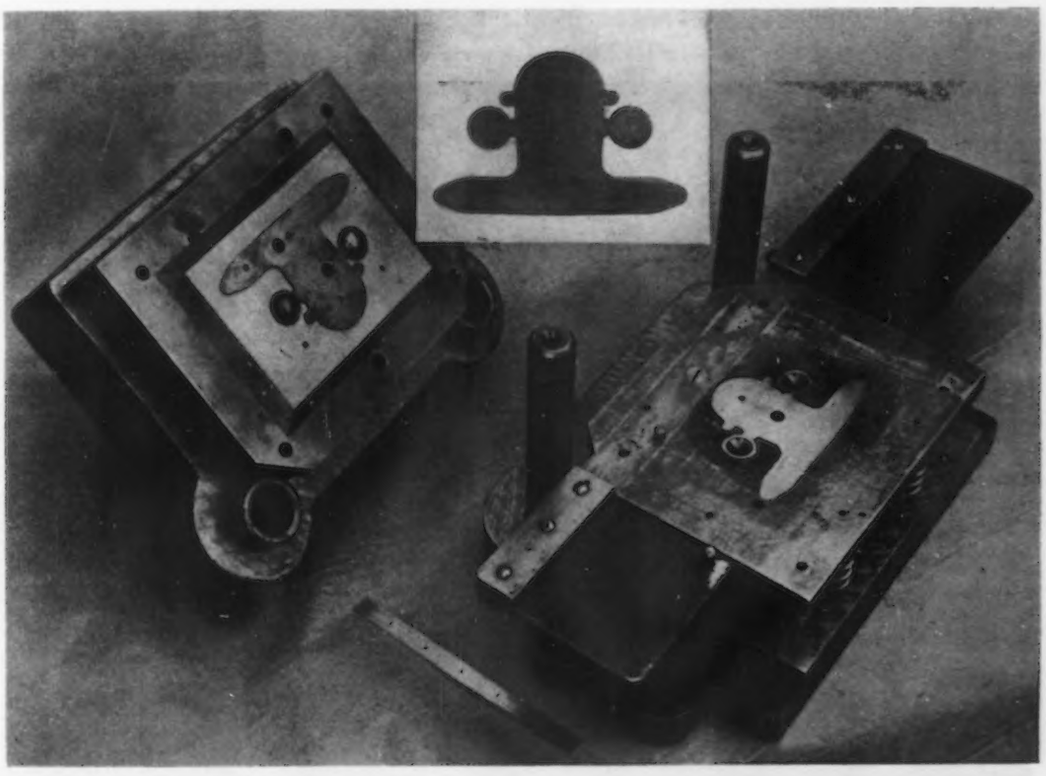


FIG. 2—This die of intermediate chrome steel air hardened has been used on quite a long run, turning out the stamping shown in the insert. Most remarkable is the fact that the user (not Westinghouse) reports that no grinding or dressing was done after tempering.

after quenching and tempering are given in Table I.

It should be emphasized that this new material does not outwear high carbon-high chrome or high speed steel. It does, however, closely approach them, and the more expensive grades need only be used where die activity of the highest order is demanded. Abrasion comparison with the manganese oil hardening steels have been shown to be from 2 to 4 times in favor of this new intermediate chrome grade.

Despite the fact that this grade hardens all the way through it possesses unsuspected strength. Even in the higher hardness ranges torsion impact values are double those of manganese oil hardening types and triple the values for high carbon-high chrome steels. In the lower hardness ranges (that is from 45 to 60 R/C) these values are even more favorable. While such hardnesses are seldom used for cold die work there have been various structural applications develop, because of this strength factor, which make these lower hardness figures a useful characteristic of the steel.

Considerable effort was made to produce various modifications of this grade which would harden at a lower temperature range than the 1750 to 1800 deg. F. range required in this case. Such efforts were balked by two controlling reasons, (1) the cost of the product remained one of the primary original conditions that could not be retained if too much alloy was added, and (2) excess alloy additions proved to have a marked effect on the volume changes which necessarily had to be held to a minimum.

TABLE I

Hardening Data (R/C) on Sparta Die Steel (1 in. Cubes, Air Quenched)

Drawing Temperature (1 hour at heat)	Air Quenching Temperature 1700 Deg. F.	1750 Deg. F.	1800 Deg. F.
As Quenched	64.0	64.5	65.0
300 Deg. F.	62.5	63.5	64.0
400 Deg. F.	61.5	62.0	62.5
500 Deg. F.	60.0	60.0	60.0
600 Deg. F.	58.0	58.0	57.5
700 Deg. F.	57.5	58.0	57.0
800 Deg. F.	57.0	57.5	56.5
900 Deg. F.	57.0	57.5	57.5
950 Deg. F.	56.0	57.5	59.0
1000 Deg. F.	55.0	56.0	57.5
1050 Deg. F.	52.5	54.5	55.5
1100 Deg. F.	50.5	51.5	52.5
1150 Deg. F.	49.0	48.0	50.5
1200 Deg. F.	45.0	45.5	46.5

The hardening temperature, however, is not any higher than that required by the high carbon-high chrome types. It is 300 deg. F. higher than the ranges used for the manganese oil hardening type but the advantages offered are judged to outweigh this admitted disadvantage. In fact recent experiences with non-fusing copper salt base paints have been so satisfactory that packing is not at all necessary and attention to the details of a perfect furnace atmosphere can be dispensed with. Oxidizing atmospheres with more than 8 per cent O_2 tend to reduce the paint and give some difficulty in the open fire but very few furnaces are left which cannot be easily regulated to a much better condition than this. The incrustation from the paint prevents even a trace of decarburization or scale. It does not fuse like borax and therefore the problem of sloppy furnace conditions is absent. It can easily be removed by light grinding or sand blasting.

Attention should be called to the very low tempering heats required. The absence of quenching strains in air cooling plus a very high inherent strength of the steel help to explain this. At the higher quenching heat there is marked evidence of secondary hardness from tempering between 900 deg. and 1000 deg. F. In this respect the new grade resembles the air hardening types of the high carbon-high chrome family.

Aside from the die applications for which this steel was devised it has assumed prominence in the field of master gages, shear blades, punches, burnishing tools, structural parts as well as a variety of other uses.

As so often is the case with an unpatentable material of merit, the value of this type of steel was immediately recognized by tool steel manufacturers generally, and several brands of the steel are already on the market in addition to the Sparta brand. This imitation is itself an indication of the merit of the steel, and is a promise for the future of this type of tool steel.

o o o

FIG. 3—A larger die of Sparta alloy used by the Westinghouse company. This alloy approaches high carbon-high chrome steel in wear resistance, and despite the fact that it hardens all the way through, the strength is quite high.

o o o

Recent Design Developments in Press Brakes and Presses

By FRANK J. OLIVER
Associate Editor, The Iron Age

o o o

THE application of hydraulic power to a press brake adds features of flexibility and safety to this type of equipment. The little known Rafter press brake is also described in this review, now that it has changed hands; also a large size brake for special work. Streamlining is being applied to the design of both mechanical and hydraulic presses. Automatic feed of coil stock for large size crank presses is now available for 72-in. wide and for relatively thick material. A number of hydraulic presses are also illustrated in this review of recent announcements of the makers, including what is probably the world's largest forming press for light gage metals.

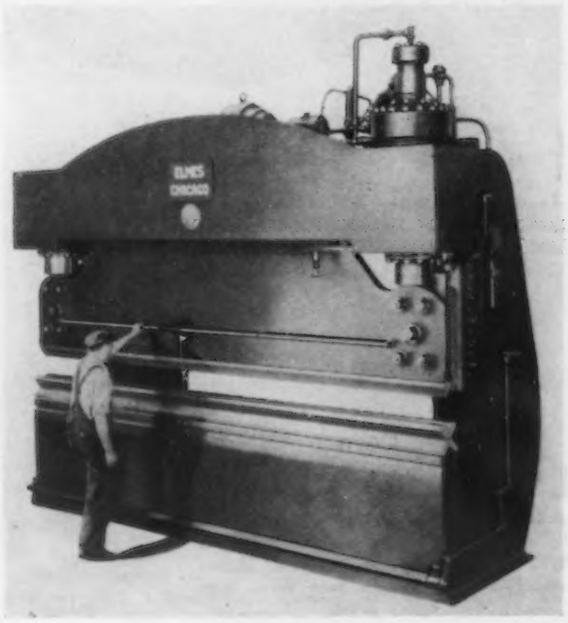
HYDRAULIC actuation has been applied to a bending brake by the *Charles F. Elmes Engineering Works,* Chicago. With this design it is impossible to damage the machine by attempting to handle work beyond its capacity. The brake will simply come down on the work and build up to its rated pressure, beyond which it cannot go because of a relief valve in the hydraulic circuit. The bending beam rapid advances, then automatically slows down for the actual bending or forming operation. Movement of the bending beam can be stopped at any point while the operator checks his progress. The return movement of the beam is under fast traverse.

The travel of the two hydraulic pistons is so equalized that it remains constant, regardless of eccentric loading, permitting forming or bending to be done at any point on the bed. Feed may be adjusted to any desired amount and the upward stroke can be limited so as to minimize the idle part of the cycle on production work. A safety feature makes it impossible to drop the bending beam when the motor is not in operation such as when changing dies. Construction of the brake consists of welded steel housings, bed and beam, in which are mounted standard hydraulic units. It is claimed to have greater depth of throat and opening than is customary. Pressure lubrication is supplied the guides.

MANUFACTURING rights for the steel press brakes heretofore made by the *Rafter Machine Co.,* Belleville, N. J., have been acquired by the *Ferracute Machine Co.,* Bridgeton, N. J., and the improved line is now being marketed through the *Bryant Machinery & Engineering Co.,* 400 West Madison Street, Chicago. The Rafter machines differ in principle from conventional press brakes in that no crown member or overhead drive is used, the power being applied below the dies through C-shaped connecting rods mounted between eccentrics in the bed and adjusting screws in the ram. The only mechanism carried on the ram is the self-contained ram adjusting device, consisting of a small high-torque reversing motor on the back connected to the adjusting screws through worm gearing. Trunnion nuts have a long bearing on the screws, which are always in a vertical position and not subject to bending strain.

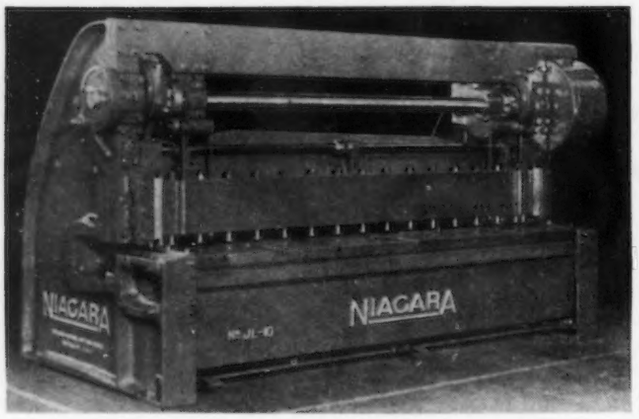
Bed frames are full throated and neither drive members nor other mechanism offer interference to work which must be passed through the machine. The bed itself is a deep section of single-thickness rolled steel plate, and the end frames, also plate steel, are welded to the bed and serve principal-

o o o

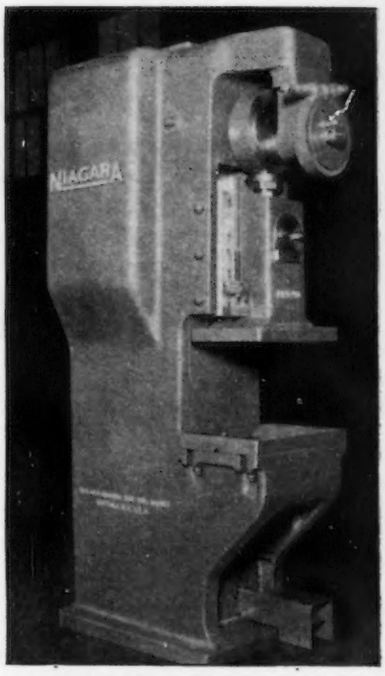


RELIEF valves make it impossible to overload this new Elmes hydraulically actuated press brake, which has fully adjustable length and speed of stroke, with rapid advance and withdrawal.

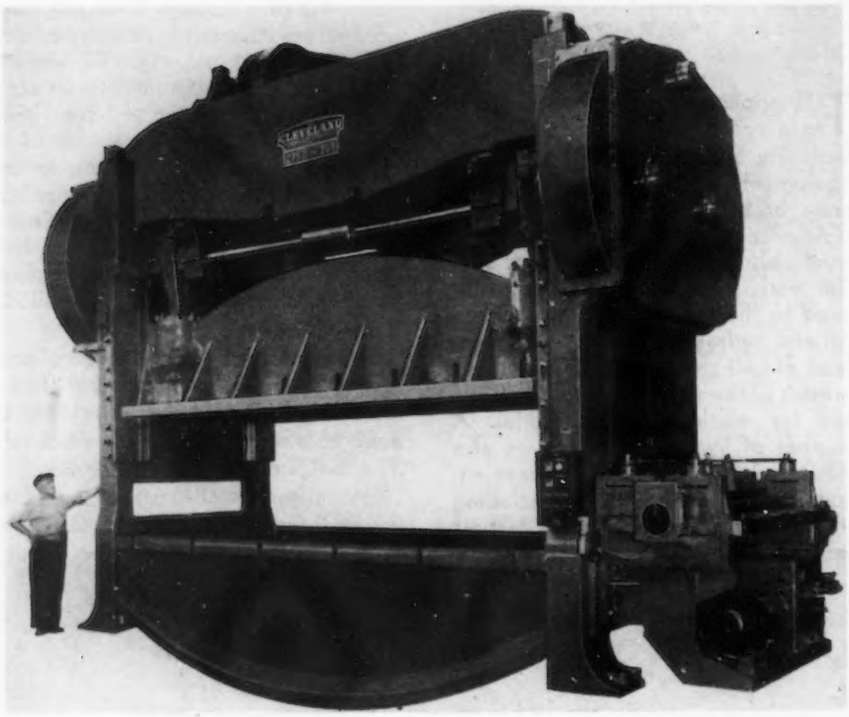
o o o



THE new series JL power squaring shears for 1/4-in. capacity are made in several standard cutting lengths by the Niagara Machine & Tool Works, Buffalo. Like the KL series, the line features completely enclosed drive with gears mounted on anti-friction bearings, 14-point sleeve clutch, massive box-section cast bed keyed and bolted to housings and a triangular section steel crosshead. The latest type ball bearing self-measuring parallel back gage is furnished.

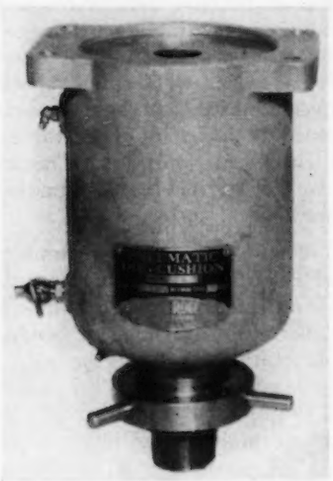


GEARING, clutch, flywheel, V-belt drive and motor are all enclosed within the cast steel frame in a new line of streamlined Niagara punch presses.



ABOVE

THIS large Cleveland power press arranged with the automatic roll feed shown and a heavy duty uncoiler and auxiliary leveling and straightening rolls (not shown) is capable of feeding 180 x 72-in. blanks at each stroke of the press. (Speed 10 r.p.m.)

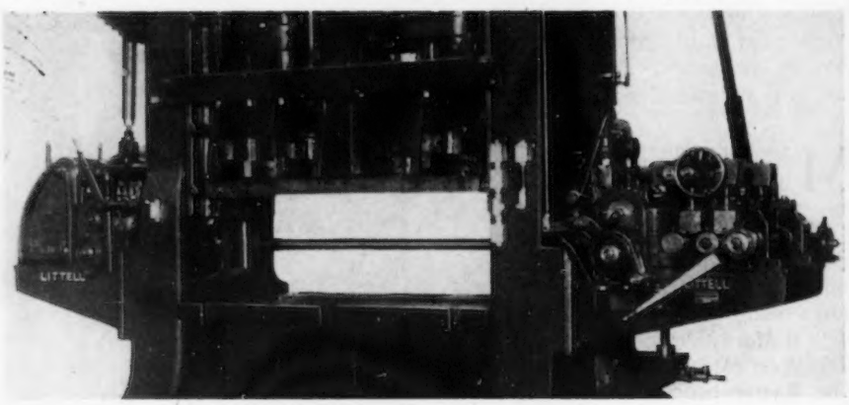


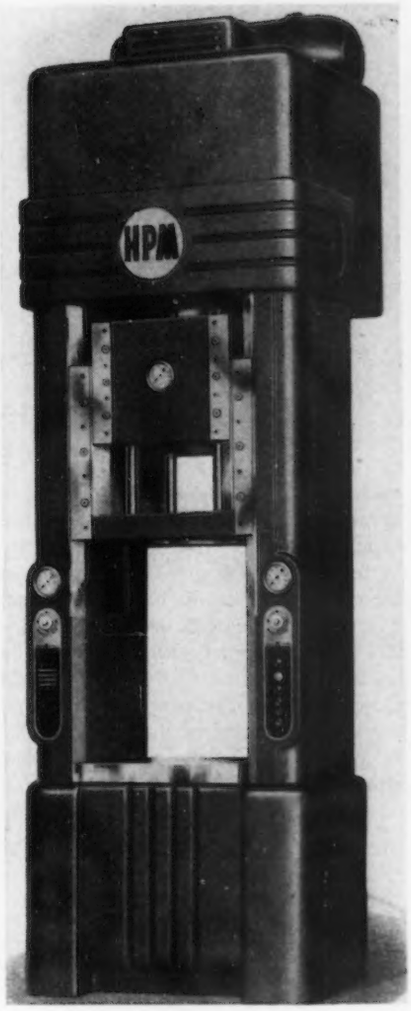
THE Model B Dayton-Rogers pneumatic die cushion has hollow steel piston stems to increase the adaptability of air cushions on inclinable and straight sided, single-crank presses.

o o o

AT RIGHT

LITTELL No. 8-26 double rack and pinion roll feed, five-roll power driven straightener, scrap cutter and 5-hp. run-in motor for feeding coil stock up to 5/32 in. thick and 24 in. wide. Shown attached to a Toledo twin drive high speed press.



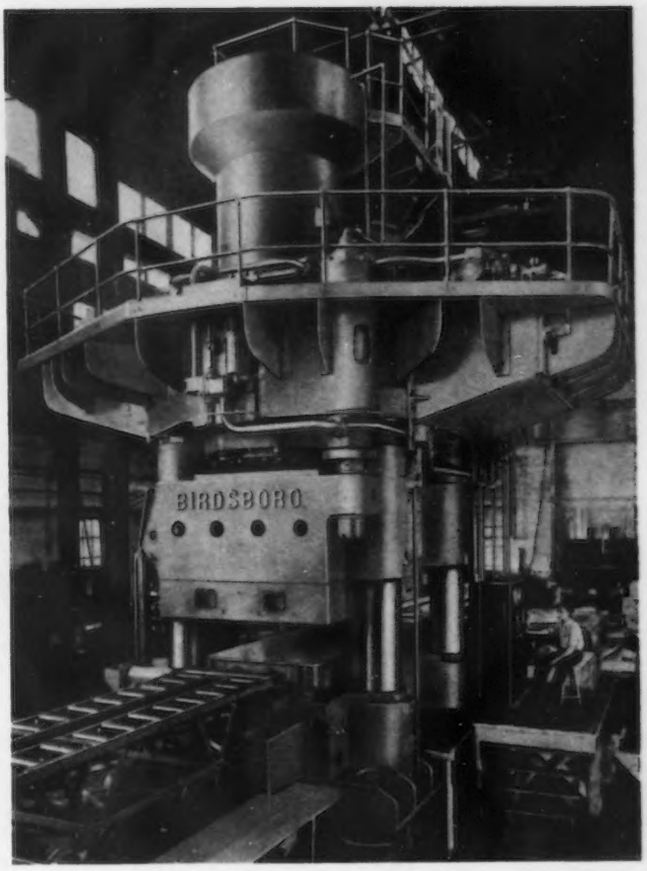


THE new Smooth Line series of H-P-M hydro-power Fastraverse presses is modernly styled and contains all the operating and control units within its smooth exterior.

o o o

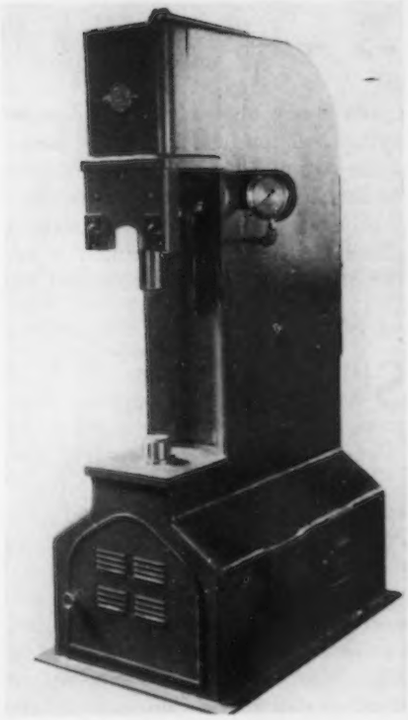
SAID to be the world's largest hydraulic press for the shearing and forming of airplane parts, this product of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., is one of a number under construction for the Russian Government. It has a platen area of 200 x 90 in., 54-in. stroke and can exert a pressure of 5500 tons. Speed and pressure are selected by handwheels and operation can be either automatic or manual. Synchronized transferring means are provided for loading the work into and simultaneously removing the finished work from the press.

o o o

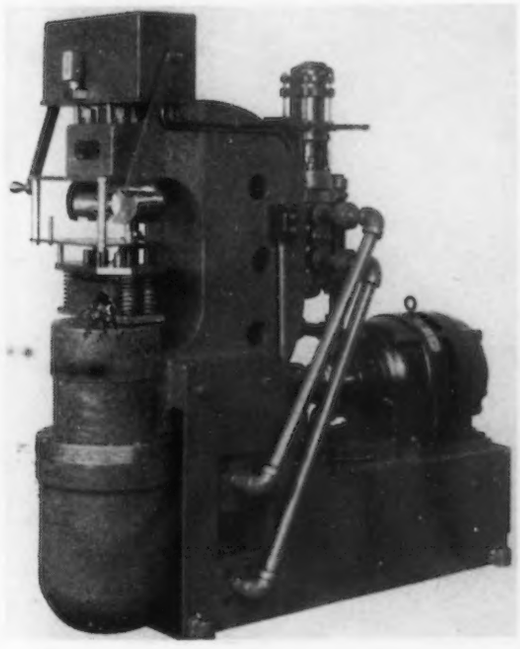


BELOW

THIS 60-ton Hanna electric-hydraulic riveting press and fixture was designed for the riveting of automobile right and left-hand front wheel control arm assemblies, involving multiple riveting at the rate of 45 rivets per min. Initial work or closing movements are started by depressing a duplex control lever; thereafter the cycle is automatic. Release of the levers will instantly reverse the pressure stroke and a repeat cycle cannot take place. Similar presses are available from Hanna Engineering Works, Chicago, in capacities of 20, 40 and 80 tons at the maximum fluid pressure.

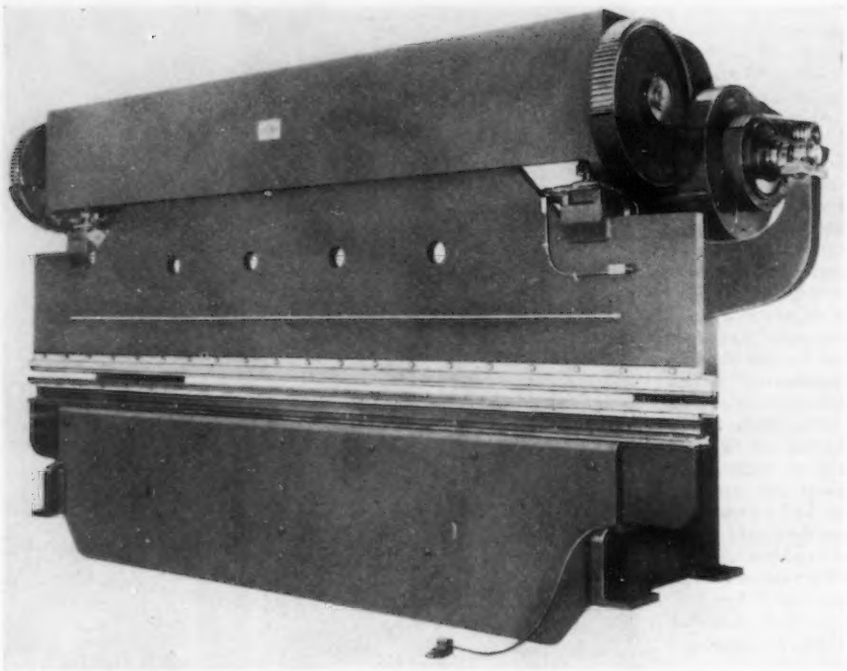


o o o



AT RIGHT

IT takes pressure on both push buttons to actuate solenoid controlled hydraulic valves and start the ram travel downward in this C-type forcing press of 8-ton capacity made by Dorr-Patterson Engineering Co., 3362 Wight Street, Detroit. Motor and pump are mounted on a plate and set in the lower section of the frame, while the oil tank is formed within the upright section, with the operating valves and coils placed above it. Release of either or both push button switches returns the ram to the top of its stroke. This type of press is made in a number of sizes and with a variety of controls.



AT LEFT

THIS large Dreis & Krump press brake has a bed and ram 20 ft. long, with 16½ ft. between housings, for forming long sheet metal sections in one operation.

o o o

ly as guides for the ram. The ram is another thick rolled plate, with a horizontal web welded to the back. Connecting rod eccentrics are carried in the ends of the bed member, centered below the dies. The built-in ram clamp will hold straight shank, L-shank or T-shank upper dies. Lower die holder is provided with a key fitting in the bed.

The motor drives through V-belts and a friction clutch, which incorporates a quick-release device. Should the brake stall at bottom of stroke, this positive action mechanism engages automatically when the clutch is reversed, backing off the ram and releasing the work.

SHEET metal sections 20 ft. in length can be formed in one operation in a large size press brake developed by *Dreis & Krump Mfg. Co.*, Chicago, to meet the needs of aircraft, bus body, railway equipment and similar industries. Bed and ram are of deep section to minimize springing and permit forming long sections straight over their entire length. Housings, bed, ram and top leaf are constructed of steel plates. New features include air counterbalance for ram and an air-operated friction clutch. The machine shown has a capacity for 10-gage material, but machines in this length can also be furnished in capacities up to ¼-in. plate. Weight is 51,000 lb. Drive is by a 15-hp. motor connected through V-belts.

o o o

AT RIGHT

RAFTER press brakes, now made by Ferracute, have an exceptionally deep ram, the movement of which is actuated by eccentrics in the base through C-shaped connecting rods exerting a straight, downward pull.

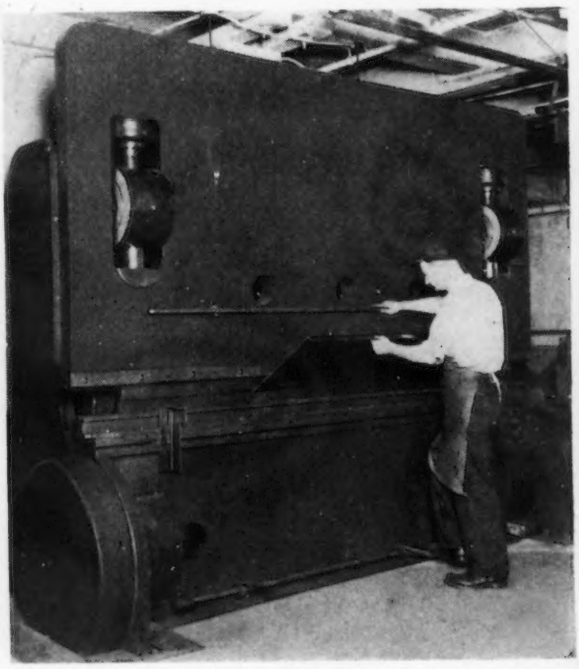
o o o

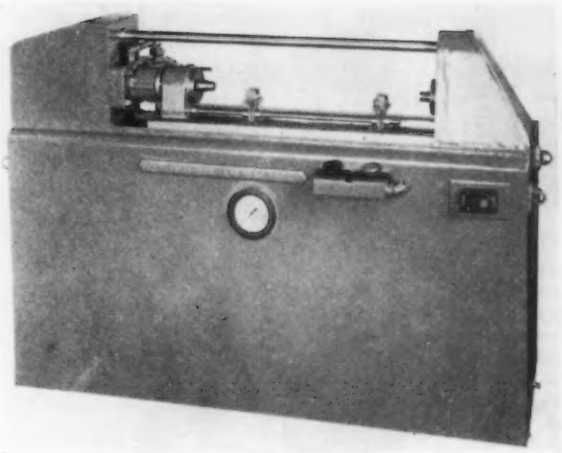
Large Press with Automatic Feed

AUTOMATIC feed from wide coil stock has been applied to a further development of the 275-D line of four-point suspension presses made by the *Cleveland Punch & Shear Works Co.*, Cleveland. In the particular size shown, 72-in. wide coil stock is placed in a heavy duty uncoiler of the cradle type, is fed through supplementary rolls for leveling and straightening and then through an automatic roll feed on the press itself, thus feeding a 180 x 72-in. blank at each stroke of the press. The feed arrangement and press operation are synchronized through an interlocking system so that the press will stop if an incorrect amount of material is fed. The press, which has bed area of 94 x 208 in., is equipped with an electrically controlled, hydraulically operated clutch, and all the control equipment, with the exception of the push buttons, is located within the housings. The slide is counterbalanced by air and all of the gearing is located in the crown.

Heavy Duty Roll Feed Unit

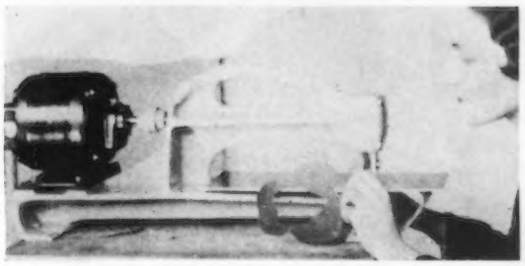
COIL stock up to 5/32 in. thick by 24 in. wide can be fed by means of a new form of heavy duty roll feed made by the *F. J. Littell Machine Co.*, Chicago. The addition of a 5-hp. run-in motor makes it easy to start the stock through the machine, although a hand ratchet is also supplied for this



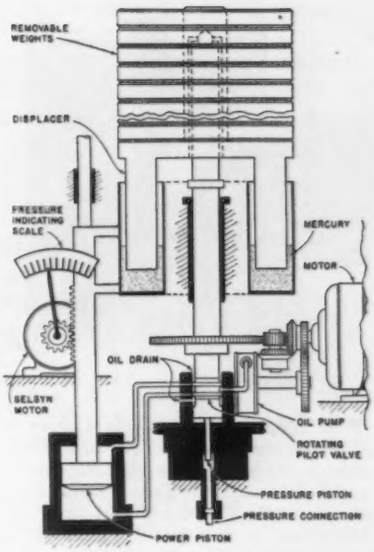


IN this 4-ton Dorr-Patterson horizontal forcing press, the parts to be assembled are placed on a sliding fixture and control of ram travel is by the large mushroom head buttons actuating solenoid valves. Motor, pump, valves and electrical devices are mounted on a plate so that the whole hydraulic pressure developing system can be readily removed for repairs. This style of press can also be had in other sizes.

o o o



THE St. Louis jig shear has been modernized in design and lightened in weight.



DIAGRAMMATIC sketch of Bailey power type pressure gage for accurate measurement of extremely high hydraulic pressures.

o o o

purpose. The entire unit consists of feeding rolls, a straightener that can be used as a three or five roll machine, and a scrap cutter of the square shear type, with the operating connecting rods in tension. Maximum length of feed is 28 in. and the feed is equipped with an automatic brake.

Streamlined Punch Presses

A LINE of streamlined punch presses in which all the drive members, including the motor, are enclosed within the cast steel frame is announced by the *Niagara Machine & Tool Works*, Buffalo. Accessibility to all working parts is provided by removable steel plates at the rear of the press. Gearing is of steel and is supported between anti-friction bearings, without overhang. Gearing and sleeve clutch are enclosed in a separate compartment in a bath of oil.

The box section flanged slide operates in adjustable V-gibs and is driven by an overhead eccentric and steel connection. It is equipped with a knockout. The Niagara 14-point engagement sleeve clutch, with a built-in single stroke mechanism is standard equipment. In fact, the company has recently announced that this type of clutch is now standard equipment on all plain and single geared, single crank presses up to and including the 6½-in. shaft size. Distribution of the load over a number of hardened and ground engaging jaws is a feature.

Power Press Accessories

A PATENT on a safety remote control system has recently been granted to the late Harold A. Tomkins and L. A. Ward of the *Tomkins-Johnson Co.*, Jackson, Mich., and has been assigned to the company. The device, which has been in use for some time, comprises an air-operated remote control valve system for controlling large presses, by requiring that all the operators' hands be placed on hand start buttons piped in series to the air cylinder that throws the clutch.

A COMBINATION pressure lubricating oil filter and motor driven oil circulating pump for purifying lubricating oil has been developed by *William W. Nugent & Co.*, Chicago, for drawing presses built by the *E. W. Bliss Co.* The system is the cascade type and furnishes a constant flow of oil to each bearing and the gear teeth. Oil drains into a large receiving pocket in the slide, from where it is drawn back, filtered and repumped.

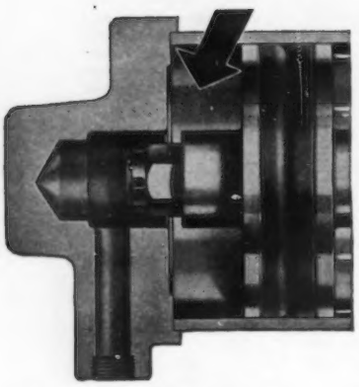
Pneumatic Die Cushions

UNIVERSAL pneumatic die cushions with hollow steel stems, known as model B, and made in seven sizes with piston diameters from 4 to 14 in., are announced by the *Dayton Rogers Mfg. Co.*, 2830 South Thirteenth Avenue, Minneapolis. This hollow piston stem design allows the scrap slugs to fall through the cushion cylinder and permits combination blanking, drawing and piercing, besides being particularly adapted to stripper control action on all compound blanking and piercing dies. The cushion cylinders may be mounted direct to the bottom side of the bolster plate or to the bottom of the bed frame of an inclinable or straight side punch press. A handwheel is provided for adjustment for the height of strippers or draw rings. Each cushion is supplied complete with a reducing regulator control valve and pressure gage. There are two sizes of hollow stems available for each cylinder size.

Hydraulic Presses

SMOOTH LINE is the name given a new line of modernly styled hydro-power Fastraverse presses made by the *Hydraulic Press Mfg. Co.*, Mt. Gilead, Ohio. Styled by Harold Van Doren & Associates, the new line is compactly self-contained with the H-P-M model 4R radial pump driven by an electric motor mounted overhead and totally enclosed to harmonize with the press outline. All piping and control mechanism is also concealed, but is readily accessible for adjustment. Rapid approach of the ram, slow pressing speed and rapid return are incorporated as in other Fastraverse designs.

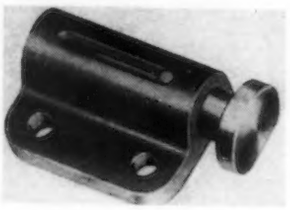
What is perhaps the world's largest



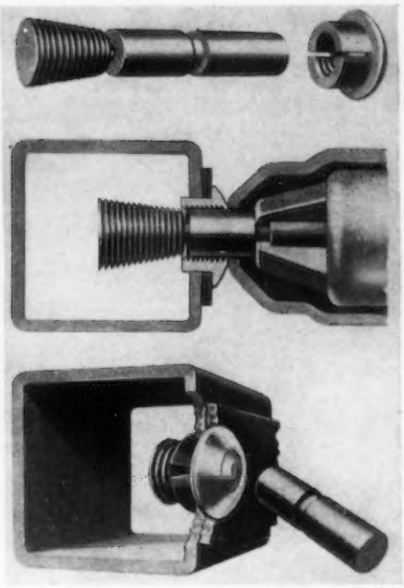
THE Nopak non-adjustable cushion type air cylinder head is now available in the same price class as non-cushioned air cylinders. Galland-Henning Mfg. Co., South 31st Street, Milwaukee, is also furnishing adjustable Nopak cushion heads at somewhat higher price. The purpose of the air cushioning is to eliminate noisy and destructive metal-to-metal contact between piston and cylinder head on air powered equipment.

MODEL 460 rapid action Knu-Lok toggle pliers lock in any position and release instantly. According to the maker, Knu-Vise Products Co., 6432 Cass Avenue, Detroit, they will not "walk" like sprung C-clamps, and are quickly adjustable to various thicknesses by a knurled screw. Made of alloy steel, hardened.

o o o



KNU-SET spring stop gage, another product of the Knu-Vise Products Co., is for use on dies when locating sheet metal parts. It is made with either right or left-hand flanged base. Button is 7/8 in. across the face.



A NEW type of pull rivet has been patented by the Hopkan Rivet Co., 128 Latham Street, Pittsburgh, for use where the rivet can be applied from the outside only of sheet or plate assemblies. As can be seen at the top, the male member has a shank with a groove in it for pulling purposes and in action this piece is pulled through the slotted female part, both of which are put through the assembly from the outside. The puller holds the female, while the male piece is pulled to its destination, at which point the shank automatically breaks off, leaving a filled hole with a smooth appearance. The rivet can be made of any steel or non-ferrous material, and the head can be made button, flat or hexagon shape.

hydraulic press for the shearing and forming of airplane parts is illustrated.

Among the hydraulic forcing presses there are also illustrated a special *Hanna* vertical type for riveting automotive assemblies and *Dorr-Patterson* horizontal and vertical forcing presses. In the case of the two vertical types it is necessary for two controls, in the one machine mechanical, in the other electrical, to be actuated to start the hydraulic cycle, an obvious safety feature.

Power Type Pressure Gage

MEASUREMENT of extremely high hydraulic pressures, in the neighborhood of 10,000 to 12,000 lb. per sq. in., and accurate to 0.1 per cent of reading is possible with a new power type pressure gage developed by the *Bailey Meter Co.*, Cleveland. As shown in the diagrammatic sketch, the pressure to be measured is applied to a small pressure piston which supports a pilot valve and a table loaded with removable weights and floating in a mercury bath. A small motor rotates the pressure piston and pilot valve so as to eliminate static friction and also drives a small oil pump for operation of a power piston which raises or lowers the cup containing the mercury bath, the indicating pointer and the Selsyn motor for electrical transmission of readings to a remote point.

Movement of the power piston is controlled by the pilot valve. The whole system is self-balancing and for each pressure applied to the small rotating pressure piston, a definite position of the power piston, mercury cup and indicating pointer is obtained. The weight platform is carried on a ball bearing and does not revolve with the pressure piston. Range of the scale reading may be changed by varying the amount of weights.

Jig Shear

SEVERAL improvements have been made in the power jig shear made by the *St. Louis Tool Co.*, St. Louis, Mo. The appearance has been streamlined and the weight reduced materially. Aluminum alloy is used in the cutter head in place of steel. The knives are hardened tool steel, the upper knife being reciprocated at the rate of 1750 strokes per min. by a *General Electric* split-phase fractional-horsepower motor. The lower knife is fixed but is retractable for starting inside closed cuts. This unit will handle compound curves as small as 1-in. radius and inside closed curves without having to drill starting holes. Capacity is for shearing up to 18-gage (0.050 in.) steel. In the new streamlined design, all moving parts are interchangeable with corresponding parts in the previous design.

Amercoat Sales Agency, 5905 Pacific Boulevard, Huntington Park, Cal., distributers of Amercoat cold-applied, synthetic organic plastic corrosion-resistant coatings manufactured by American Concrete & Steel Pipe Co., South Gate, Cal., has appointed Robert E. Lanier & Co., Electric Building, Houston, Tex., as exclusive distributer for the state of Texas, Oklahoma, Arkansas, Louisiana and Mississippi.

Central Nebraska Power and Irrigation District, Third and St. Joseph Streets, Hastings, Neb., George E. Johnson, chief engineer and general manager, asks bids until Dec. 30 for penstocks for Johnson Canyon No. 1 and No. 2 hydroelectric generating stations, each requiring about 250 tons of steel, work to be carried out in conjunction with construction of power house structures and intakes, for which bids close at same time (Item 1 and 2, respectively).

Steel Leaders Observe Anniversary of Stainless

MORE than 150 of the steel industry's leading members helped commemorate the "Twenty-fifth Anniversary of the Discovery of Stainless Steel" at a banquet held Tuesday evening, Dec. 13, at the Duquesne Club, Pittsburgh.

Since its discovery in 1913, stainless steel has played a role of increasing importance in the daily economic life and health of the nation. Applications of its rust and corrosion-resistant qualities are apparent all about us. Its ever-widening range of uses extends all the way from table service and cooking utensils in our homes to extensive application in hospitals; the food and chemical processing industries, automobiles, trains, ocean liners, bridges, skyscrapers and countless others.

Several of the industry's outstanding authorities on the manufacture and use of stainless steel addressed the assembled group. Speakers included Dr. V. N. Krivobok, associate director of research, Allegheny-Ludlum Steel Corp., who talked on "The Origin and Development of Stainless Steel." L. S. Bergen, associate metallurgist, Crucible Steel Co. of America, whose subject was "The Standardization of Stainless Alloys," and J. H. Van Deventer, editor of THE IRON AGE, who outlined the "Commercial Aspects of Stainless Steel." Benjamin F. Fairless, president of the United States Steel Corp., was toastmaster.

Light Products Total 46% of Steel Output During 3rd Quarter

REFLECTING the relative stability of demand for steel from industries producing consumers' goods, light steel products represented a larger proportion of total production in the third quarter of 1938 than in any quarter in the preceding two years, according to a recent analysis of steel production data by the American Iron and Steel Institute.

Approximately 46 per cent of the tonnage produced for sale by the steel industry in the third quarter of this year consisted of sheet and strip steel, wire products, tin plate and other light steel products used largely by manufacturers of automobiles, farm and household goods, sanitary cans and similar products.

By comparison, light steels represented only 42 per cent of total production in the corresponding quarters of both 1936 and 1937.

Heavy Products Drop

Total tonnage of light steel produced in the third quarter of 1938 was 2,417,000 gross tons, a decline of about 40 per cent from the third quarter of last year. Production of rails, structural shapes, plates, pipe and tube, and other heavy products, however, declined 50 per cent between the two periods to a total of 2,871,000 gross tons.

For the first nine months of this year, light steels accounted for 45 per cent of total output, as against 42 per cent in the corresponding periods of the two preceding years.

Production of sheet and strip steel, alloy steel bars and cold finished carbon bars, for all of which the automotive industry is the major outlet, represented 25 per cent of the total in the third quarter of this year as against 27 per cent in the third quarter of 1937. For the first nine months of this year, those products were 23 per cent of the total as against 28 per cent in the corresponding period of 1937. Tin plate output for the first nine months of 1938 represented 7½ per cent of the total, as against 6 per cent a year ago.

Rail Percentage Off

Output of steel products used chiefly in construction, such as structural shapes, plates, concrete reinforcing bars, nails, etc., represented 21 per cent in the third quarter of 1938 and 20 per cent in the corresponding period a year ago. For the nine-month period, those products amounted to 21 per cent of the 1938 total, as against 19 per cent last year.

Purchases of steel by railroads in 1938, as indicated by the output of rails and fastenings, car wheels and axles, were relatively lower than the year before. Those products represented 4 per cent of total output in the third quarter and 5½ per cent of output for the first three quarters of 1938, as against 4½ per cent and 6 per cent respectively in the third quarter and nine-month period of 1937.

1000 Invited to Ceremony Opening New Irvin Works

PITTSBURGH. — More than a thousand of America's leaders of commerce and industry were to participate in the day-long program of activities at the formal opening of "the Mill on the Hill," Carnegie-Illinois Steel Corp.'s new Irvin works, on Dec. 15.

Guests at the opening-day ceremonies were to view the plant in operation and attend a luncheon at the works, going by special train to the mill, returning in the evening for a reception and dinner at the William Penn Hotel. J. L. Perry, president of Carnegie-Illinois, was scheduled to preside as toastmaster at the dinner.

Carnegie-Illinois, largest operating subsidiary of United States Steel Corporation, acted as host to a number of the corporation's officials. Among those invited were Benjamin F. Fairless, president; Myron C. Taylor, former chairman, and Edward R. Stettinius, present chairman of the board of directors; E. M. Voorhees, chairman of the finance committee; and W. A. Irvin, vice-chairman of the board, in whose honor the plant is named.

Others invited to participate include customers who will use the products of the plant and public officials and business leaders of the Pittsburgh area. Special trains brought groups of executives from New York, Chicago, Cleveland, and other centers.

Bethlehem Expands Pipe Warehouse Facilities

BETHLEHEM Steel Co. has acquired some of the assets of International Supply Co., Tulsa, Okla., formerly a subsidiary of the Oklahoma Iron Works. This acquisition will give Bethlehem Steel additional warehouse facilities throughout the Southwest for oil country pipe. International Supply Co. has 24 warehouses serving the Southwestern oil country.

THIS WEEK ON THE ASSEMBLY LINE

o o o

By W. F. SHERMAN
Detroit Editor

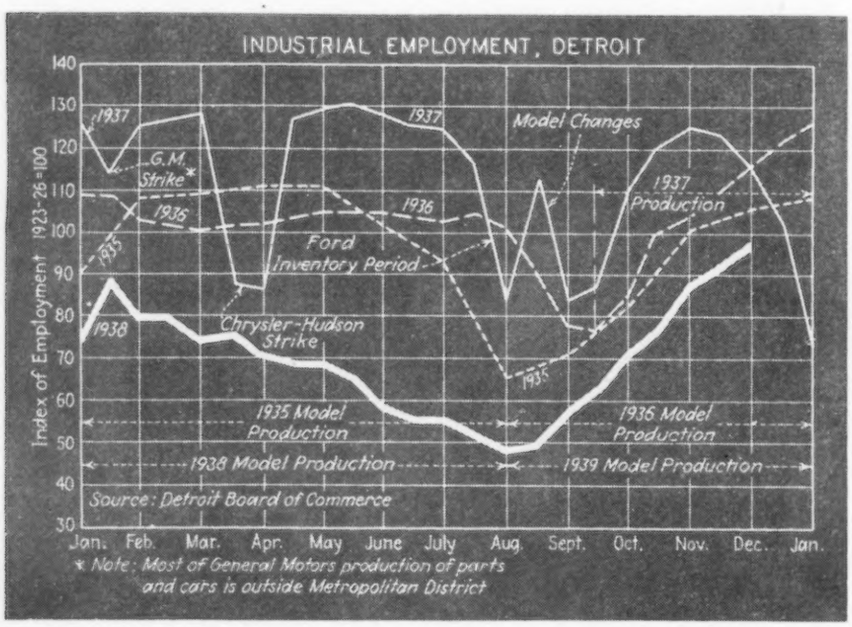
o o o

. . . Auto industry expected to average 100,000 a week through January . . . Retail sales continue to increase, company records show . . . Employment doubled in four months.

DETROIT.—Weekly automobile production finally has attained the 100,000 goal toward which it has been pointed. The high level of automobile production as the year nears its close is accompanied by high employment rate and a continued forward-looking attitude on the part of other industries in the area.

Car and truck output last week was estimated at 100,705 units by Ward's Automotive Reports. This compares with 97,795 units in the previous week and 85,763 in the corresponding week last year. The week's output was the greatest for any similar period in 16 months and a revised estimate of November production, bringing the total to 378,000 cars, marks the first time this year that the monthly total has improved over the comparative 1937 figure.

Still further improvement in the production rate is anticipated but it will be minor in nature. The industry will maintain this rate through January and at least part of February. Probably about that time there will be a slight decrease because dealers will be supplied and back orders completely filled by that time. A sharp rise through the spring months is confidently looked for and the industry as a whole expects to be kept busy up to the time when new model preparations again become its main interest.



Ford Aims at 4400 a Day

Ford-Mercury production jumped upward during the last week to 20,500, an increase of 2650 over the previous week's output. The total indicates that Ford has attained the 4000 goal announced a few weeks ago. It is now indicated that further increases during December are projected, with 4400 a day as the goal — in fact late last week one day's output did reach 4100. Chevrolet maintained its production at 26,000 and General Motors as a whole showed no change in production levels, except for the loss of one day's production at Buick when the plant was closed on account of the Fisher Body strike. Plymouth registered a gain from 12,170 to 13,800.

General Motors has made a comparison of its November sales with the figures for November a year ago and shows an increase from 195,136 to 200,256. Sales in October of this year were 123,835. Comparison of the first 11 months of 1938 shows sales of 1,119,840 compared with 1,956,453 for the same 11 months of 1937.

Buick Sales Break Records

Sales of Buicks during November broke all company records for the month, besides establishing a new high for the year. Domestic retail deliveries were 21,576 cars, according to W. F. Hufstader, general sales manager. Continued increase is indicated by the record of the last 10 days of the month

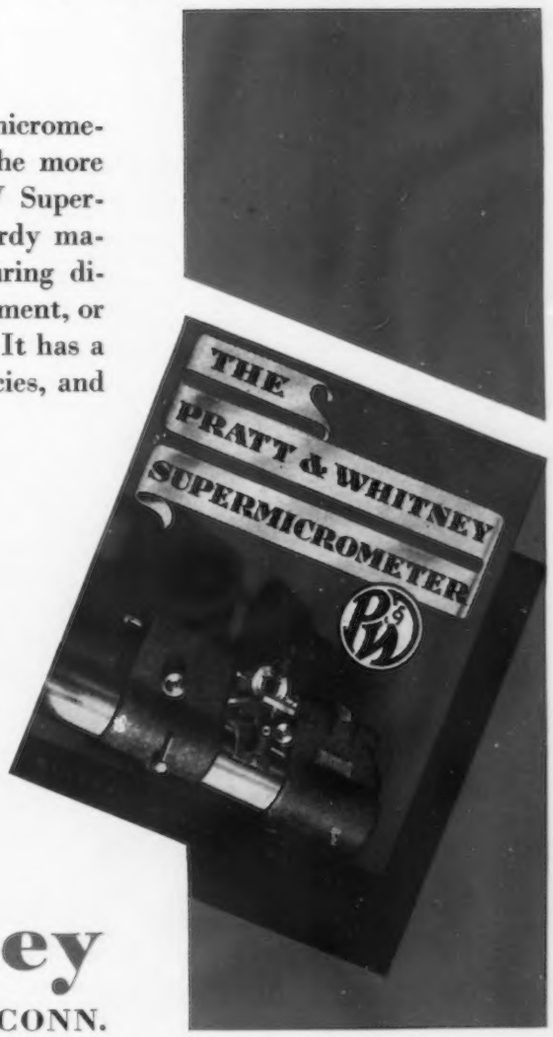
Being Sure

. . . to .0001"

MEASURING threads to "tenths" is no job for a hand micrometer. The wide gap between that instrument and the more expensive measuring machine is the place for the P&W Supermicrometer. It is just what its name implies—a light sturdy machine for everyday *shop* use—capable of accurate measuring directly to .0001". It takes all guessing out of thread measurement, or any other "tenth" measuring within its range of 9 inches. It has a pressure tailstock to eliminate "human element" inaccuracies, and to provide the measuring pressures of 1 pound and 2½ pounds recommended by the National Bureau of Standards for three-wire thread measuring. You set for one pressure or the other with the small knob on the left end of the tailstock. The P&W Supermicrometer enables any mechanic to measure easily and accurately to ten-thousandths.

• • • • •

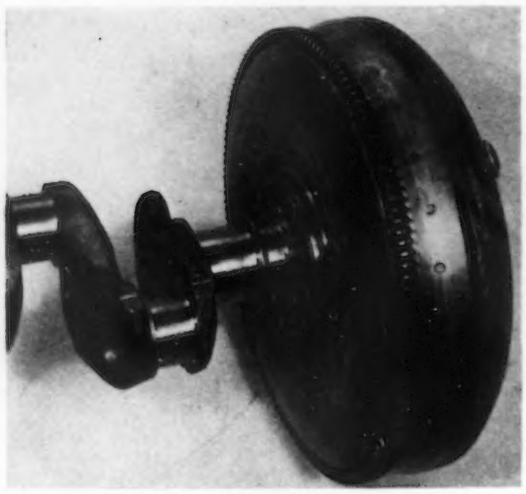
This book describes the Pratt & Whitney Supermicrometer in detail. It can show you how to put "tenth" measuring right on your shop bench to test your important threads and fine work, or to check your gages and accurate instruments. Write for a copy today.



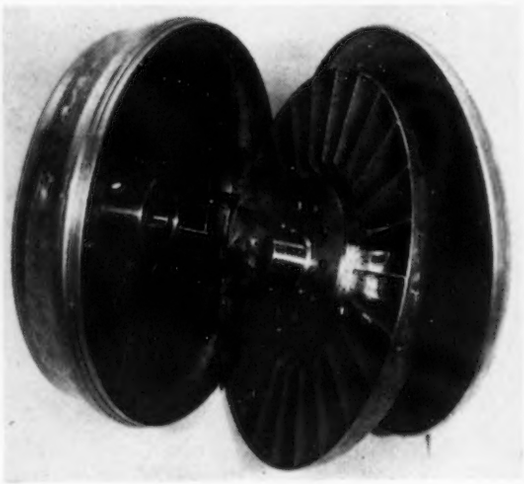
Pratt & Whitney

Division Niles-Bement-Pond Co. • • • HARTFORD, CONN.

Chrysler's New Fluid Drive



HERE are two close-ups of Chrysler's new fluid drive. In the picture showing part of the crankshaft, the fluid drive unit is seen enclosed in its steel housing. The other photo shows the mechanism opened to reveal the 22 vanes of the driver and the 24 vanes of the runner, or driven unit. Greatest departure from previous practice (mostly in Europe) is the use of stamped housings and vanes. European cars which use this type of flywheel make use of castings or die castings, iron and aluminum being the common materials. The Chrysler vanes, outer housing and the runner disk are made of cold-rolled steel stampings, the vanes are riveted and the outer housing sections welded together. The hub parts are forged steel. In operation the assembly is filled with a low viscosity mineral oil.



when 7503 cars were delivered against 7246 in the previous 10 days and 5933 in the corresponding period a year ago. Shipments of Hudsons in the United States for the week of Dec. 3 were 57 per cent higher than for the same period a year ago, that company announces. Cadillac-LaSalle sales were the largest for November in the 37-year history of the company; 4285 cars were delivered to customers during the month, topping a year ago by 40 per cent and the best previous November by 30 per cent. Here again there is evidence of increasing retail demand with the three 10-day periods during the month showing customer deliveries of 1270, 1411 and 1604 respectively. Oldsmobile retail sales were 25 per cent greater than for last November, and in the last 10 days of the month Olds sales showed a 52 per cent increase of the same period last year.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

FAMOUS ENGINEERS DESIGNED THESE ACCIDENT-PROOF MACHINES-- I DON'T SEE HOW YOU COULD DO IT!
I DON'T NEITHER, BUT I DID!
THAT GUY THINKS HE'S GREATER THAN THE EXPERT WHO BUILT THEM FOOL-PROOF MACHINES, BECAUSE HE GOT HIS NECK-TIE CAUGHT IN AN UNKETCHABLE MACHINE
IT'S GUYS LIKE HIM THAT PUT ENGINEERS TO WORK PUTTING US OUT OF WORK! THEY'LL SOON HAVE ONE MAN RUNNIN' ALL THESE MACHINES WITH PUSH BUTTONS FROM A STEEL CAGE!
COPR. 1938 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
THE FOOL-PROOFER
J.R. WILLIAMS 12-9

Swelling production has more than doubled the amount of employment in Detroit (Wayne County) in the last four months, with the employment index Dec. 1 standing at 97.6 compared with 47.8 on Oct. 1. At the first of the month there were 351,000 factory employees on the job compared with 172,000 last summer. Employment, however, is still under 1937 level when the index stood at 115.1.

More Hand-to-Mouth Buying

The December report of purchasing activity in Detroit's metal-working industries indicates a leveling off in buyer interest. Hand-to-mouth buying shows an increase from 10 per cent in October to 15 per cent in November. In addition, buyer apathy has reduced all advance buying compared with a month ago. Only 17 per cent of the firms reporting to the Purchasing Agents Association of Detroit are buying on a 30-day basis, whereas 24 per cent were in that classification a month ago. In the 60-day classification there has been little change, while the number buying 90 days ahead has de-

creased from 28 per cent to 25 per cent. The indications are that business is holding down inventories for the year end, partly due to the fact that commodity prices are expected to stay at the present level for the next four to six weeks at least.

The other day an engineer, well acquainted with activity which goes on behind closed doors when new models are being conceived, declared that decisions on 1940 designs are still pending and probably will not be made until after Jan. 1. There is little indication, he said, that radical changes, such as rear engine drives, will be seriously considered when decisions are made.

It was revealed last week by K. T. Keller, president of Chrysler Corp., that the new Dodge truck plant, northeast of Detroit (Assembly Line Nov. 3), has been designed to manufacture war munitions as well as trucks. He said that the plant could be quickly converted to produce many types of war materials.

"We have the machines and we have the clearances necessary to make cannon," he said. "We can manufacture anything except armor plate and wide-span aircraft." Last summer, when there was some doubt whether the plant would be utilized for truck manufacture because the depression appeared not to have been broken, it was reported that immediate use of the plant for munitions was contemplated.

Toledo Activity Increasing

Activity in automotive and allied lines has assisted nearby Toledo to register sharp gains for the sixth consecutive month. Factory employment in 51 selected plants is 18,939, setting a new high for 1938. In the more than 500 plants in Toledo, it is estimated that about 55,000 are now employed. Automotive industrial gains are reflected in the glass industry which is rapidly nearing peak operations. Willys-Overland Motors, Inc., will operate at full schedule during December. At the beginning of the month unfilled orders were nearly 65 per cent greater than at the same time a year ago. November production was all sold before the final assembly line started.

Oilgear Co., Milwaukee, announces that its Cleveland representatives, E. C. Wollaeger and I. X. Calhoun, have moved their office to 3109 Mayfield Road, Cleveland.

Charles Bond Co., 617-623 Arch Street, Philadelphia, has appointed F. Raniville Co., 241-247 Pearl Street, N.W., Grand Rapids, Mich., as distributer of Bond stock gears and speed reducers.

WHY
NITRIGAGES
DO A BETTER
ALL-AROUND JOB AND
SAVE YOU
MONEY

Nitrogen hardened case 900 to 1100 Monotron Brinell.

Sheffaloy base metal is both tough and ductile—does not shatter or break on accidental impact.

Highlight Precision Lapping (exclusive Sheffield development) eliminates the outer skin after finish grinding to expose the hardest metal of the case.

Nitrigage Finish—true, with maximum smoothness.

Chrome Anchor plug and ring gages, patented development to reinforce the end of the gage, minimizing chipping or scaling.

Nitrogen hardening a great asset in salvaging a gage, because it provides maximum cohesion with the chromium plating necessary in building up to the new size.

Nitrigages increase gage life 300 to 2500%. You can reduce the cost per hole gaged in your inspection work by standardizing on Nitrigages.

SHEFFIELD
GAGE CORPORATION • DAYTON, OHIO, U.S.A.
MASTER GAGEMAKERS
NITRIGAGES

THIS WEEK IN WASHINGTON

. . . Incentive taxation would expand employment, plant facilities, Tax Research Institute tells Senate committee . . . More steel companies protest minimum wage ruling . . . Monopoly group hears testimony on patents.

o o o

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON. — American business would react to the benefits of incentive taxation by increasing employment and expanding its plant and facilities, the Tax Research Institute said in a report to the Senate Finance sub-Committee Investigating Incentive Taxation last Wednesday. The report was based on a nation-wide survey of the institute's members, who employ over 6,000,000 people, the survey being conducted at the request of the Senate Finance Committee. Executive Secretary Leo M. Cherne of the institute, who submitted the report, urged as one of 13 legislative recommendations that specific tax reductions be allowed to individual businesses conditioned upon the percentage of increased employment in each business.

The report was made as an increasing number of business interests declared that the best "incentive" to business would be reductions in taxes. Some of the witnesses favored, and others opposed, profit sharing plans. President Edsel Ford of the Ford Motor Co., contending that reduction in Federal taxation would be "as good an incentive" to business as anything the Government could do, replied in the affirmative when asked by Senator Vandenberg, Republican of Michigan, if he felt that incentive taxation designed to promote plant expansion, purchase of equipment and regularization of employment might create more problems than it would solve.

Sloan on Taxes

Alfred P. Sloan, Jr., chairman of the General Motors Corp., likewise told the committee that "the best application of the tax incentive principle appears to me to be a reduction of the general taxes on business, because it has the economic effect of reducing prices and stimulating greater productivity of industry, resulting in the expansion of present units and the development of new products so essential to an advancing standard of living."

He declared that the tax incentive principle as applied specifically to industry has been used in other industrial countries—some in rather a broad way, and has accomplished much for the general purposes that the committee has in mind. There are difficulties involved in the application of certain of these plans due to limitations of definition, he said, but if there is a real desire to promote more and better jobs, these are not insurmountable. Continuing, Mr. Sloan said:

"I believe that the specific application of the tax incentive principle that offers the broadest opportunity for accomplishment and conforms to the essential general conditions is a plan to stimulate the substitution of new instruments of production for the old, thus creating employment in the capital goods industries which are vital in any continuing prosperity. It is not only this additional productivity and employment that counts, but more particularly promoting the use in industry of instruments of production which make possible lower costs of goods and services. Speaking generally, it is a fact today that America's production plant is obsolete, as measured by today's technology. The true way to enlarge present pay envelopes and provide more envelopes for more workers is to do those things that mean lower prices. This can only be accomplished by increased productivity. Today, the tax structure as constituted, and its administration, tend to discourage the substitution of the new for the old. Anything that can be done in the way of tax incentive — and I think much can be done in the general direction that I am urging—will, in my judgment, be a real step toward the objective which the committee has in mind.

Urges Simplification

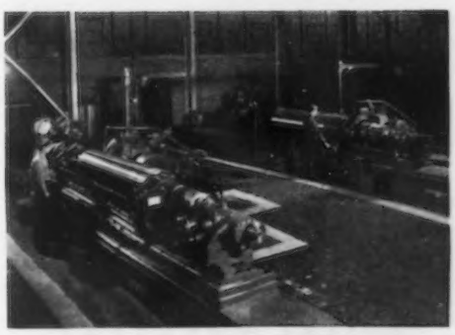
"In addition to the general specific approach to the tax incentive principle, there are many detailed suggestions that might be considered that will tend to simplify the present tax structure and act as an incentive in other ways, even if not exactly within the strict definition of what constitutes a tax incentive; therefore they ought to be studied as well."

Mr. Sloan opened his remarks by saying there seems to be much confusion respecting definition of profit sharing. Many plans, he stated, have been adopted by industry to help the worker which have nothing to do with profits. It was declared that they might better be called "benefit plans." There were said to be only a limited number which are really true profit sharing plans. He maintained that true profit sharing is not applicable as a broad procedure "simply because, outside of a limited number of special cases that always arise, there are not sufficient profits to apply an equitable formula and mean anything consequential to the worker except perhaps in limited periods of prosperity." Even then, it was stated, the principle is ap-

GROUND ON A CINCINNATI ROLL GRINDER

THE degree of surface perfection in your rolling mill products is an exact reproduction of the finish on the roll. That's why CINCINNATI Roll Grinders are built with careful attention to the production of precision finishes. In the roll illustrated, which was ground on a CINCINNATI Roll Grinder, the clear reflections in such perfect detail are indicative of the high quality of finish this roll will impart to rolled sheets. Sound engineering principles, many of them exclusive to CINCINNATI, contribute to this smooth reflective finish. Complete descriptions are given in literature; G-392 for the 14" and 16" Plain Self-Contained Grinders, and G-383 for the 20", 24", and 28" Roll Grinders.

Photo Unretouched



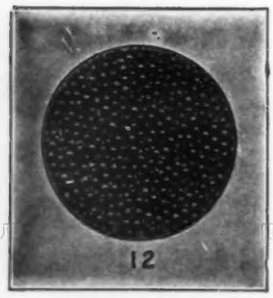
● *CINCINNATI 28" x 192" Roll Grinders at work in the roll shop of a prominent steel mill. In mills all over the country, these machines are helping to raise the quality of rolling mill products.*

Both Centerless and Center Type Grinders

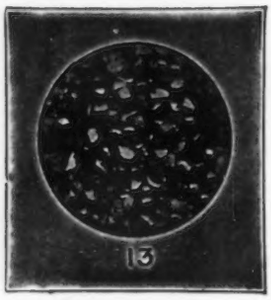
CINCINNATI GRINDERS INCORPORATED
CINCINNATI, OHIO, U. S. A.

CINCINNATI

A SYMBOL OF A DEFINITE STANDARD OF WORTH



SHOT



GRIT

Unusual quality is creating demands for both our Heat-Treated Chilled Shot, and Heat-Treated Steel Grit.

One contract calls for 300 tons of our steel grit; another contract calls for 250 tons of our Special Heat-Treated Shot. Many carload lots of both shot and grit.

There must be a reason for this, and the reason is plain: namely, unusual quality; prompt deliveries; uniform quality the year round; satisfactory prices.

Send samples of the sizes you are now using. We will match any size, and name prices that will interest you.

We manufacture a shot and grit that you will eventually use.

HARRISON ABRASIVE

Corporation

MANCHESTER, NEW HAMPSHIRE

We Never Compromise With Quality

plicable in relatively few instances, unless so much of what there is of profits is so diverted as to prejudice the profit motive. As an example, he explained that the return on capital employed of the 16 leading industrial organizations in their respective fields, with a capital of $100,000,000 or more apiece, has only been 8 per cent over the past 15 years. Mr. Sloan said that in all manufacturing companies the average return is less than 5 per cent per year over this period. In addition to this profit limitation, Mr. Sloan said he believed there are other real practical objections to true profit sharing. Therefore, he contended, its use should be determined by the judgment of individual management without the application of the tax incentive principle.

More Pay In Poor Years

"I believe that what industry can afford to pay to the worker in addition to the highest economic wage can best be used for promoting stability of work, stability of income, or both," Mr. Sloan said. "We need to supplement the worker's income in poor years, rather than try to increase it in the good years. A little something extra in good times serves to establish a standard of living that cannot be maintained. It causes dissatisfaction.

"Our experience in General Motors has taught us that the best plan is the biggest pay envelope that is possible, under any particular circumstances, supported by the maximum possible protection against the business cycle, the seasonal trend and incapacity to work due to the vicissitudes of life. Anything that can be done in the way of promoting those general objectives, from the tax incentive principle, is both socially and economically desirable.

"When it comes to tax incentive as a principle, in the abstract, I am of the opinion that it is impossible to take a position for or against it. Each proposal must be considered not only as to itself, but as to its method of application. Any plan should contemplate a broad application along the industrial front, otherwise it prejudices the competitive setup and may become a penalty, in some instances, even if it is an incentive in others. If the application is very limited, it becomes a subsidy, and that is highly undesirable."

Would Expand Business

The institute survey revealed that if future tax laws provide additional deductions or credits for improvement or expansion, more than 82½ per cent of the institute's members would expand business activities accordingly. This expansion, the report said, would cause 74 per cent of the business to increase employment as a result. That the American business man believes the Administration tax policy including the undistributed profits tax and the excess profits tax stands squarely in the way of business recovery was revealed by the survey. It showed that 72 per cent of the firms tabulated stated that they had been definitely handicapped by the undistributed profits tax. Almost 50 per cent of the thousands of business and professional men questioned indicated that they would prefer a flat 18 per cent corporate tax to an undistributed profits tax which might require only a 16½ per cent tax.

Other points disclosed by the survey showed that: Less than 5 per cent of the institute's members will discontinue profit sharing plans if they were entirely free to do so; if the Government would give some type of compensatory taxation credit to the establishment of such plans, 12½ per cent of the institute's members would immediately establish the profit sharing plan; 48½ per cent would consider its establishment, and only 29 per cent would refuse to adopt the principle; four out of five would increase employment if given a tax reward and almost as many would market new products or increase their production if provided with some tax incentive to do so.

After declaring that he believed the high wage scale had prevented any serious labor troubles in Ford plants, Mr. Ford said his company tries to be more than fair to its employees, to pay just as high wages as it can and to produce at as low a cost as possible, thus creating volume production. He ventured the opinion that the company's system of sharing profits through high wages was more simplified, more workable and less paternalistic than other profit sharing plans.

Navy Approves Designs For "Mosquito" Fleet

WASHINGTON.—Plans submitted by 12 designers, covering torpedo boats and submarine chasers, have been tentatively approved by the Navy Department as suitable for further development in its program to build up the Navy's small-craft or "mosquito fleet." The department extended to Feb. 1, 1939, the time for submitting further designs on torpedo boats and to Feb. 8 the deadline for sub-chaser plans.

Government Buying Of Steel Declines

WASHINGTON. — Awards for iron and steel products under the Walsh-Healey Act during the week ended Dec. 3 dropped to $80,321 and contracts for machinery declined to $167,789. Detailed contracts in these and related groups for the week follow:

IRON, STEEL PRODUCTS:

Treadwell Construction Co., Midland, Pa., steel pipe	$20,395.00
Bethlehem Steel Co., Bethlehem, Pa., bars	28,556.40
Columbian Steel Tank Co., Kansas City, sections, boat hull	16,875.00
Johnson City Foundry & Machine Co., Johnson City, Tenn., structural steel	14,495.00

NONFERROUS METALS & ALLOYS:

Scovill Mfg. Co., Philadelphia, blanks for 5c. pieces	$52,000.00

OTHER MACHINERY:

Caterpillar Tractor Co., Peoria, Ill., tractors	$13,994.00
E. W. Bliss Co., Brooklyn, cartridge machines	18,000.00
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., tracer bullet charging machines	32,400.00
Brown & Sharpe Mfg. Co., Providence, R. I., grinding machines	22,799.00
Caterpillar Tractor Co., Peoria, Ill., earth moving and grading combination outfit	10,252.08
Pioneer Engineering Works, Inc., Minneapolis, rock crushing and screening plants	12,800.00
Clyde Iron Works, Inc., Duluth, Minn., windlasses	25,450.00
Singer Sewing Machine Co., New York, sewing machines	18,267.25
Singer Sewing Machine Co., Atlanta, Ga., sewing machines	13,827.00

ELECTRICAL APPARATUS & SUPPLIES:

Goodman Electric Supply Corp., Norfolk, Va., copper wire	10,050.33
Peter A. Petroff, New York City, reel unit	35,384.90
H. O. Boehme, Inc., New York City, recorder equipment	10,796.42
Woodward Governor Co., Rockford, Ill., governors	19,446.00
Wagner Electric Corp., St. Louis, transformers	20,092.00
R. E. Uptegraff Mfg. Co., Pittsburgh, electrical material	10,515.42

TRANSPORTATION EQUIPMENT:

The Cleveland Pneumatic Tool Co., Cleveland, nuts, bolts, etc.	$10,444.00
Hartzell Propeller Co., Div. of Hartzell Ind., Inc., Piqua, Ohio, propeller blades	15,900.00
Automobile Sales Co., Inc., Memphis, Tenn., trucks	26,507.00
Yellow Truck & Coach Mfg. Co. (G. M. Truck & Coach Div.), Pontiac, Mich., trucks	187,140.30

Wage-Hour Law Covers Machine Shops, Foundries

WASHINGTON. — Machine shops and foundries will not be considered in the same category with service establishments which are

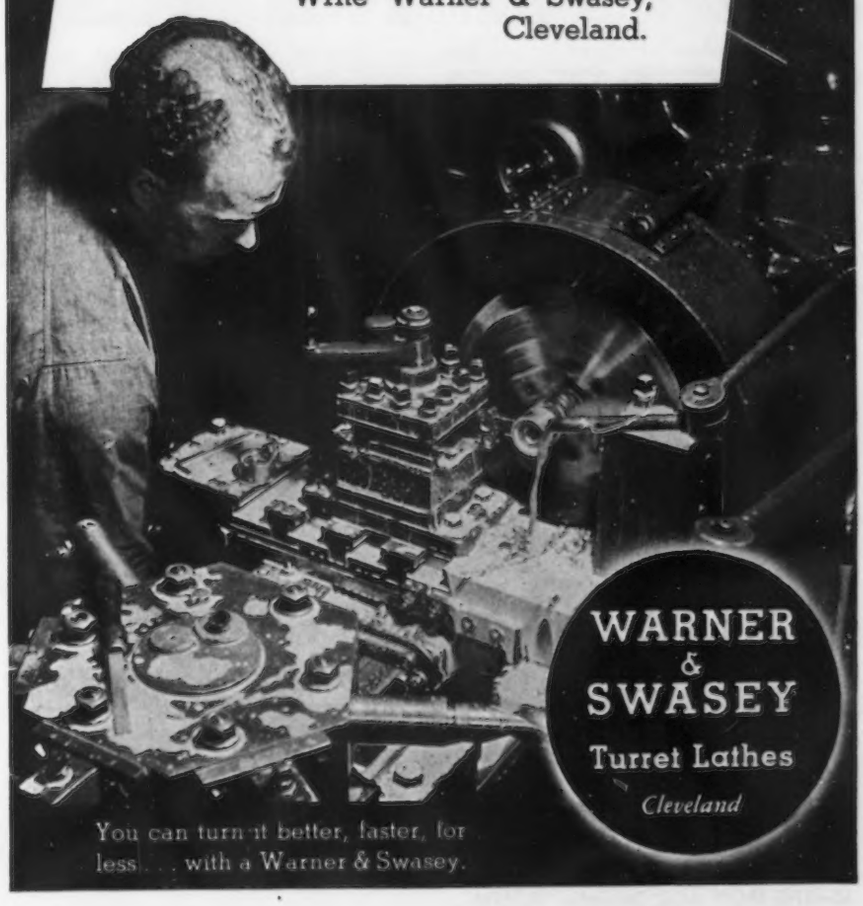
OPPORTUNITY FOR *Executives*

In hundreds of plants Warner & Swasey surveys have resulted in savings as high as $14,000 a year, in a single department, even on the basis of low production.

It is not necessary to spend a dollar today to find out what you must do to cut costs and make more money. A Warner & Swasey survey will show you — and there's no obligation. You will be given proven facts on your turning work, detailed tooling set-ups, and many other points — all proven to make more money for you.

Get these facts now — and use them. Other plants are doing it. A Warner & Swasey survey can help you be the low cost-high profit plant in your industry — — and remember, that's the plant which always gets the business.

Write Warner & Swasey, Cleveland.



specifically exempted under the wage and hour law, the Wage-Hour Administrator has ruled. Numerous letters have been received from both shops and foundries in which the companies point out that they perform "services" but the Administrator has expressed the opinion that such enterprises are not, in the ordinary case, sufficiently similar in character to retail establishments to be considered "service establishments" under the law and thereby claim exemption.

Monopoly Committee Undecided After Testimony on Patents

WASHINGTON.—Members of the Temporary National Economic (anti-monopoly) Committee, after two days of testimony from representatives of three automobile manufacturing companies and the Automobile Manufacturers Association, failed to display unanimity of opinion last week as to what changes, if any, they would recommend in existing patent laws as a result of the testimony.

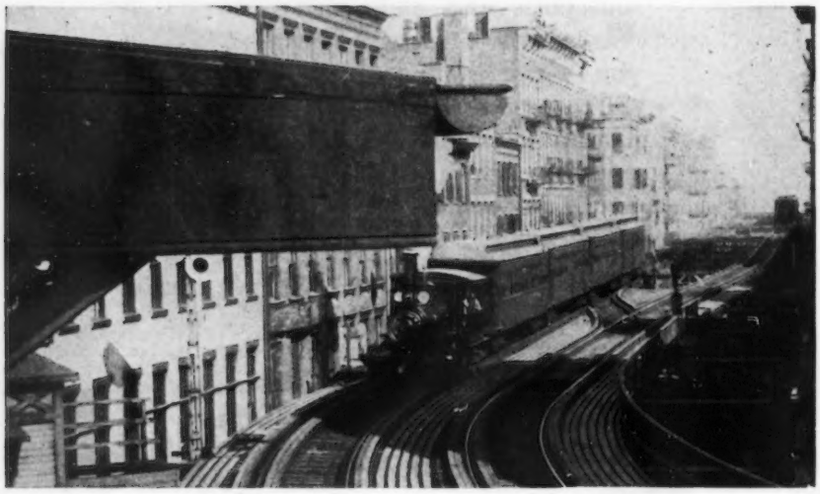
The committee, which is empowered to investigate the effect of existing patent and other Government policies upon competition, price levels, unemployment and profits, heard Edsel Ford, president of the Ford Motor Co.; Alvan Macauley, president of the Packard Motor Car Co.; William S. Knudsen, president, and Charles F. Kettering, vice-president, of General Motors Corp.; and Alfred Reeves, general manager of AMA. Congressional members of the committee made a few observations throughout the two-day session but they were largely a reflection of proposals they have made in the past, many of which have been embodied in bills drawn up but never passed by Congress.

Definite Stand Unlikely

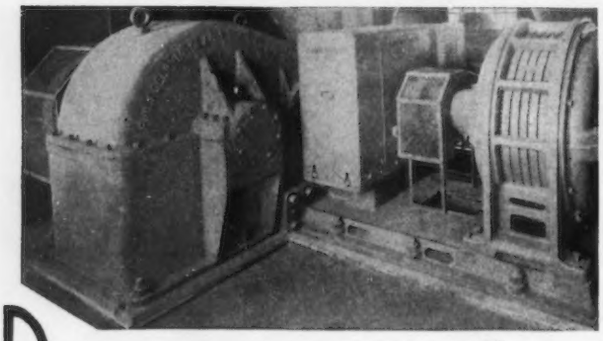
Among the legislative proposals made last session was a bill providing for the compulsory licensing of patents, a measure designed to prohibit the patenting of "labor saving" machines and another which would establish a single court of appeals having national jurisdiction and final authority in the determination of questions arising out of patent grants. Public hearings on some of these proposals last session elicited testimony similar to that given to the anti-monopoly committee last week, and it was believed that Congressional members will redraft their proposals and submit them when the new Congress convenes in January. It was considered highly unlikely that the committee would take any definite stand on the patent situation at this time.

In fact, so much of the testimony given by the industry last week so obviously pleased members of the committee that the rumor gained some credence that the committee, by a prearranged plan, had selected the automobile industry as one in which the use of patents could be cited as a good example in contrast to industries in which the handling of patents has been some cause for concern by the Justice Department's anti-trust division. In announcing that representatives of the glass container industry would appear before the committee on Dec. 12, Chairman O'Mahoney explained that the testi-

Is your POWER TRANSMISSION EQUIPMENT as obsolete as this wood-burning "El" of the '80's?



In many industrial plants the devices used for transmitting power have not kept abreast with the adoption of the newer developments in production machinery. A check-up in *your* shop may show the need for modern Philadelphia Speed Reducing Units. Since they are available in every possible type, there's not a drive in your set-up that cannot be efficiently, economically and safely transmitted through Philadelphia Units. For example, on heavy duty work, where resistance to shock or frequent reversals must be met, the Philadelphia Herringbone Reducer acknowledges no equal. Let our engineers discuss your requirements with you. Their impartial recommendations will save you money.



Here is the modern drive

This Philadelphia Herringbone Unit operates a heavy conveyor. In its sturdy housing are the alloy steel gears with teeth that have been cut to split-hair accuracy. Bronze and roller bearings on the shafts assure long, smooth running.

PHILADELPHIA HERRINGBONE *Speed Reducers*

Philadelphia Gear Works

Industrial Gears and Speed Reducers

Erie Avenue and "G" Street

PHILADELPHIA

mony probably would present a strong contrast to the use of patents made by the automobile industry.

What Testimony Showed

As summarized by Chairman O'Mahoney, the testimony presented by the automobile industry spokesmen shows that (1) the industry employs patents largely for purposes of protection against infringement suits; (2) it does not try to make money out of patents through royalties, but that when royalties are charged they seem to be primarily for the purpose of recovering development costs; (3) it does not use patents to obtain control of the market but regards them as assets but not crucial ones; and (4) it does not use patents to suppress competition or to increase profits but rather depends upon production and the sale of its products to bring financial returns.

A description of Ford's free licensing plan, Packard's policy of paying and receiving royalties, and the AMA-sponsored plan of cross-licensing as practised by most of the other companies prompted Senator Borah, Republican of Idaho, and Assistant Attorney General Thurman Arnold to remark that the use of patents apparently was so unrestricted in the industry that it might not suffer if the use of patents were abolished completely.

Knudsen Opposes Abolition

Mr. Knudsen and Mr. Kettering expressed opposition to such a move, pointing out that it would be detrimental to industry generally because patents provide an incentive for improving and developing existing devices. The latter defended patents as valuable both to small and large companies, explaining that they provide valuable protection during "short-losing" periods when an invention was in the early stages of development. No one, Mr. Kettering said, ever knows how valuable a patent may be until it reaches the consumer.

Suggestions from members of the committee that the 17-year term of patents be shortened were turned down by Milton Tibbetts, vice-president of the Packard Motor Car Co., who reminded the committee that the 17-year term has worked out very well in the past. He also turned aside a mandatory licensing proposal that industry should be allowed use of a beneficial invention on payment of some reasonable sum, explaining to the committee that there are many small concerns that depend for their existence upon the exclusive rights granted them in patents they hold,

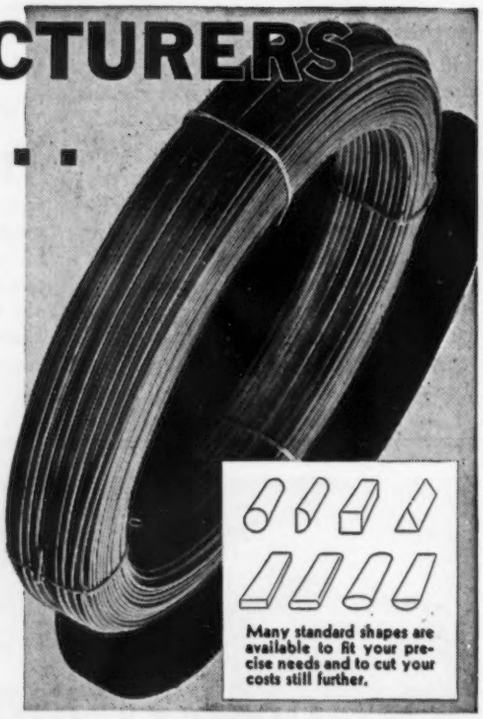
The AMA's cross-licensing plan, under which member-manufacturers interchange patents held as of 1930 without charge, was described by Mr. Reeves as contributing to competition and the low prices of automobiles in the industry. He traced its early history and recalled that the plan developed as a result of litigations growing out of the Selden basic patent.

War Branches to Urge Stocking of Materials

WASHINGTON.—Although the War and Navy Departments will urge passage of legislation at the next Congress to build up stock piles of manganese, tin, nickel and other so-called strategic and critical materials in which the country is deficient, President Roosevelt will not go to the extent of recommending the legislation to Congress in his message early in

LANSING STAMPING COMPANY
EXPERIENCE ✓
FACILITIES ✓
PERSONNEL ✓
DELIVERIES ✓
ON THE TRUCK AND ON THE AUTOMOBILE
For a quarter -- century we have been accumulating the plant and personnel which enables us to serve you economically and advantageously.
Your requirements of Pressed Metal Products will receive experienced attention and will be accurately and promptly produced. Send us your inquiries.
LANSING STAMPING COMPANY
LANSING, MICHIGAN

MANUFACTURERS WIRE . . . . .



Products or parts made from wire usually can be made better or more economically — often both — by taking advantage of the correct combination of composition, temper, finish and shape offered by Continental's wide variety of specialized wire for manufacturing. Furnished in special-analysis open hearth steel; also in *KONIK, a patented steel containing copper, nickel, and chromium.

CONTINENTAL STEEL CORP.

General Offices: Kokomo, Indiana
Plants at Canton, Kokomo, Indianapolis

OPEN HEARTH STEEL

Wire: Bright Basic, Annealed, *Konik, Special Manufacturers, Galvanized, *Flame-Sealed.

Wire Rods, Nails, Staples, Bale Ties, Barbed Wire; Fence—15 Types; Gates and Fittings.

Sheets: Black, Galvanized, Special Coated; Roofing and Siding—14 Styles.

*Trade Mark Reg. U. S. Pat. Office.

CONTINENTAL

SHEET STEEL AND WIRE PRODUCTS

QUICK ACTING

ENGINEERS • DESIGNERS
MANUFACTURERS
Pneumatic and Hydraulic Production Tool Equipment

The Hannifin Spring Return Valve gives instant reversal of air cylinder upon release of the foot pedal, providing most convenient, quick-acting control for air operated equipment. Simple, disc-type design has no packing, and no leakage or packing maintenance troubles. Disc and seat are ground and lapped for a perfect seal.

Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, electric and special models. Write for Valve Bulletin 34-A.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue • Chicago, Illinois

HANNIFIN "Packless" AIR CONTROL VALVES

January. This was indicated by Mr. Roosevelt last week at a press conference. Mr. Roosevelt indicated the national defense program is still in the study stage but that as a general thing he favored financing the undertaking on a pay-as-you go basis.

Buffalo Company Must Rehire 31, NLRB Rules

WASHINGTON.—The National Labor Relations Board ordered McKaig-Hatch, Inc., of Buffalo, N. Y., to reinstate with remedial wages 31 employees who allegedly were discriminated against and refused reemployment following a strike in September, 1937, resulting from the refusal to recognize the Amalgamated Association of Iron, Steel and Tin Workers Union, as sole bargaining agency. The board also overruled the finding of its trial examiner and directed that the McKaig & Hatch Athletic and Welfare Association, which it described as "company inspired and dominated," be disbanded.

Wheeling Steel Builds New Galvanizing Plant

STEUBENVILLE, Ohio. — Construction work on a new galvanizing plant at Wheeling Steel Corp.'s Steubenville works is now under way. The immediate installation includes four units, with a total rated capacity of 5000 tons of sheets a month. Plans have also been provided for additional divisions of four units each as may be required.

The corporation has other galvanizing facilities at its Martins Ferry and Portsmouth plants. Steubenville was chosen as the site for the new galvanizing plant owing to the availability of buildings already under roof and also because the major portion of sheet tonnage for galvanizing is produced at Steubenville.

Standards Bureau Ends Frameless-Steel Test

RESULTS of tests on 30 specimens of cellular sheet steel walls, floors, and roofs sold by the Insulated Steel Construction Co., under the trade name "Frameless-Steel," are presented graphically and in tables in Building Materials and Structures Report No. 9, which has just been released by the National Bureau of Standards. Copies of BMS9 are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10c. each.

. . . PERSONALS . . .

JOHN J. GOLDEN has been appointed superintendent of steel production at Gary works of Carnegie-Illinois Steel Corp. He succeeds A. W. Slater, who has resigned.

Mr. Golden goes to Gary works from the Corporation's South Chicago plant, where he began in 1911 as an office boy. He served as a relief foreman, stock foreman, general relining foreman, and assistant superintendent of various open hearths. On Oct. 1, 1935, he was advanced to the superintendency of the No. 2 open hearth at South works and remained in that capacity until his present appointment.

JOHN J. GOLDEN

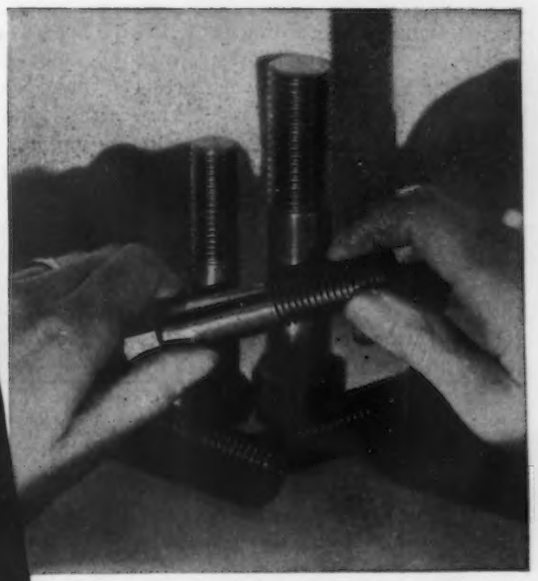
❖ ❖ ❖

RUSSELL L. WILLIS has been made assistant manager of sales, structural and bar division, Weirton Steel Co., Weirton, W. Va. He was formerly on structural and plate sales at the St. Louis office of Bethlehem Steel Co. Mr. Willis entered the steel business with the fabricating plant of Lackawanna Steel Co. at Buffalo in 1922. When Lackawanna was merged with Bethlehem in 1923 he was transferred to the Buffalo sales office. In 1924 he went to Bethlehem's Philadelphia office, in 1927 to New York office, and in 1930 was made manager of structural and plate sales at the company's St. Louis office.

❖ ❖ ❖

W. J. O'NEIL, former vice-president of Dodge Brothers Corp., has been advanced to the office of president and

BY THE BOX OR BY THE MILLION!



Kaufman PROCESS » » IS A METHOD OF MAKING BETTER cap screws

• Of course you can get cap screws which may meet your requirements that are not made by the Kaufman Process. But why not get greater strength and accuracy of fit when it costs you no more? Thread strength and accuracy is far greater in a cap screw made by the Kaufman Process, *patented*, our own plant development—than by any other method. Finish is improved—wrench fit is uniform—and a Class 3 fit insured. New standards of cap screw quality were set up when the Kaufman Process was developed. Ask for samples. THE CLEVELAND CAP SCREW COMPANY, 2929 East 79th Street, Cleveland, Ohio.

Address the Factory or Our Nearest Warehouse:

CHICAGO, 726 W. Washington Blvd.
PHILADELPHIA . 12th & Olive Sts.
NEW YORK . . . . 47 Murray Street
LOS ANGELES . 1015 East 16th St.

CLEVELAND CAP SCREWS
SET SCREWS • BOLTS AND NUTS

ELECTRIC RESISTANCE BUTT WELDED

Rings, Bands, Ring Gear Blanks In Carbon or Alloy Steel, Welded Steel Tubing

Your Inquiry Will Receive Prompt Attention

THE AMERICAN WELDING & MFG. CO.
WARREN OHIO

"If It's Round We Can Make It"

general manager, according to K. T. Keller, president of Chrysler Corp. Mr. Keller has held the Dodge presidency since the acquisition of the corporation by Chrysler. Mr. O'Neill, active in Dodge management since 1928, put the Dodge plants on a modern production basis. In 1900, after a business course, he worked as secretary to Bruno Nordberg, president of Nordberg Mfg. Co., Milwaukee, and a year later began a machinist apprentice course there. He completed this course at the Allis-Chalmers Co. and worked as a machinist and tool maker. In 1907 he became night superintendent of the Milwaukee Motor Co. In 1911 he went to work for the Packard Motor Car Co. in charge of time study. In 1914 he left Packard to join, in an executive capacity, the Fairbanks Morse Co., Montgomery Ward & Co. and A. O. Smith Corp., in that order. Joining the Maxwell Motor Co. in 1921, he became master mechanic in 1926, plant manager of Dodge in 1928, vice-president of Dodge in charge of manufacturing in 1930 and vice-president and general manager in 1935.

❖ ❖ ❖

D. J. RICHARDS, heretofore divisional sales manager in Pittsburgh for E. F. Houghton & Co., Philadelphia, has been appointed manager of steel mill sales, with headquarters in Pittsburgh. He has had more than 20 years experience in the steel industry with the Houghton company and in steel mill service. He is a graduate in mechanical engineering and metallurgy of the University of Pittsburgh.

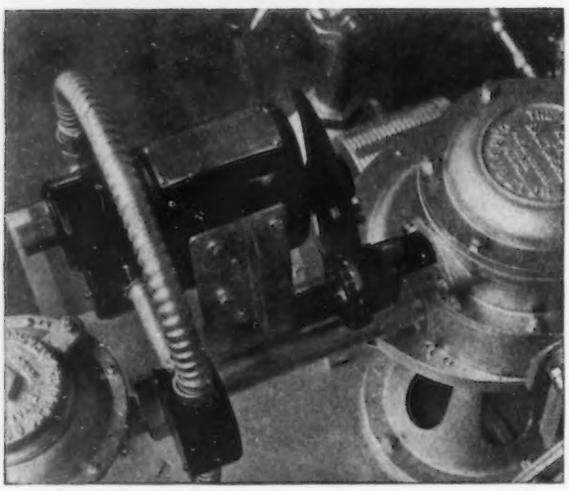
D. J. RICHARDS

❖ ❖ ❖

WALTER H. STEWART, for the past two years district sales manager of the St. Louis office of Truscon Steel Co., Youngstown, Ohio, has been appointed manager of sales, reinforcing products division, with headquarters in Youngstown. He joined the engineering department of the company in 1924.

R. H. SARTOR, formerly manager of sales of the Crittall-Federal Co., Waukesha, Wis., has been made manager of sales of the steel window and door division of the Truscon company. After his graduation from Purdue University in 1907 he was acting chief engineer of the Panama Railroad and joined the Truscon company in 1920.

C. B. MCGEHEE, district sales man-

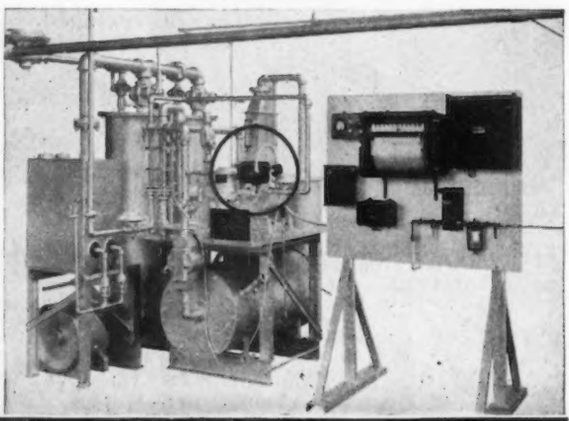


You Name it!

The New **C. A. MONITOR**

Gives You Exactly the Atmos-Gas Analysis You Ask For

Set the desired gas analysis manually when your Atmos-Gas Producer is placed in operation and the Constant Analysis Monitor, a sensitive, swift-acting electrical nervous system, insures bright-annealing gas of *exactly* the desired analysis. Changes in the three hitherto uncontrolled variables, specific gravity of fuel gas, thermal value of fuel gas and combustion air supply are automatically and instantaneously compensated for. The C. A. Monitor installation, shown below, is operating the smallest Kemp Atmos-Gas Producer (1000 C. F. H. Capacity). It may be used with *any* atmosphere generator having controllable characteristics.



For special bulletins on Atmos-Gas, address **The C. M. Kemp Mfg. Co., 405 E. Oliver Street, Baltimore, Md., or Oliver Building, Pittsburgh, Pa.**

KEMP of BALTIMORE

IF YOU DO CLOSE QUARTERS DRILLING, SCREW DRIVING, NUT RUNNING

INVESTIGATE CP "MIDGETS"

New models recently added now make the popular CP "Midget" line of Universal electric tools more valuable than ever for continuous production work where confined working space and ease of handling are factors. Ideal for airplane, automobile, auto body, radio, refrigerator, furniture and sheet metal industries. 3/16" and 1/4" drilling capacities; No. 8 wood or 3/16" machine screw driving; 3/16" nut running. Write our nearest branch office for Catalog No. 899.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 6 EAST 44th STREET, NEW YORK, N. Y.

BIRMINGHAM • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT
DULUTH • EL PASO • HOUSTON • KANSAS CITY • LOS ANGELES • MILWAUKEE • PHILADELPHIA • PITTSBURGH
ST. LOUIS • SALT LAKE CITY • SAN FRANCISCO • SEATTLE

SALES AND SERVICE STATIONS ALL OVER THE WORLD

CHICAGO PNEUMATIC

EL-2-38

ager in Dallas for the Truscon company, has become manager of sales of the highway products division of the company. He joined the company in 1928 as chief engineer of the Atlanta office. He was graduated from Georgia School of Technology in 1925.

❖ ❖ ❖

FRED. E. BARTH, of the Graton & Knight Co., Worcester, Mass., has been elected president of the American Leather Belting Association, New York. GEORGE L. ABBOTT, of Alexander Brothers, Inc., Philadelphia, has been made first vice-president; MAJ. A. E. CARPENTER, of E. F. Houghton & Co., second vice-president; ARTHUR H. RAHMANN, of George Rahmann & Co., New York, treasurer. J. L. NELSON is secretary.

❖ ❖ ❖

G. CLIFFORD LIVEZEY, formerly of W. S. Hurst & Co., industrial engineers and public accountants, has been elected president of the Metals Coating Co. of America, Philadelphia.

PRODUCTS
Steel Castings
Forgings
Rolled Wheels
Heavy Springs
Rolled Rings
Gear Blanks
STEEL CASTINGS THAT DEMAND EXPERIENCE
This casting — a steel stern frame—typifies the class of difficult steel castings produced by Standard. Prompt service in the production of steel castings and heavy forgings is made possible by our ample equipment and broad experience.
The steel used in Standard's products is acid open hearth produced in our own furnaces under close metallurgical control.
STANDARD STEEL WORKS CO.
Subsidiary of the Baldwin Locomotive Works
BURNHAM PENNA.
STANDARD

CHARLES H. ATHERHOLT has been elected vice-president.

❖ ❖ ❖

BERNARD C. CASE has joined the sales staff of the Hanson-Van Winkle-Munning Co., Matawan, N. J. He was graduated from the University of Michigan in 1928. He has been engaged in chemical work, first for the Eaton Mfg. Co. and later for the Bridgeport Brass Co., where he was in charge of plating.

❖ ❖ ❖

GEORGE A. BURNHAM has resigned as assistant manager of the electrical department, in charge of switchgear sales and engineering division of the Condit works of the Allis-Chalmers Mfg. Co., Boston. He will be succeeded by W. S. EDSALL, sales manager. Mr. Burnham will be retained in a consulting capacity. He was president of the American Brown-Boveri Co. After the purchase by Allis-Chalmers of certain electrical interests of the Brown-Boveri company, he continued as president and treasurer of the Condit Electrical Mfg. Corp. until Jan. 1, 1937, when the Condit plant was operated as a branch of the Allis company.

Mr. Edsall, after conducting experimental work on submarine detection during the World War, entered the employ of the Sperry Gyroscope Co. In 1920 he became identified with the Condit Electrical Mfg. Corp. and was made sales manager in 1922. When Allis-Chalmers purchased the company in 1931, Mr. Edsall continued his connection as manager of sales of the Condit works and later of the switchgear division.

❖ ❖ ❖

MEYER W. SINGER, of the company of the same name, Pittsburgh, has been elected president of the Pittsburgh chapter of the Institute of Scrap Iron and Steel. EDWARD L. SOLOMON has been elected vice-president.

HENRY D. ISRAEL has been made vice-president and L. W. PRYSE secretary-treasurer of the Dayton chapter of the institute. JACK LEVAND has become secretary and BEN L. NEWMAN treasurer of the Cleveland chapter. Other officers of both chapters have been reelected.

❖ ❖ ❖

WALTER B. STRONG, formerly manager of the export division of the Worthington Pump & Machinery Corp., Harrison, N. J., has been appointed assistant general sales manager and will continue general super-

vision of export sales. He is a graduate of Massachusetts Institute of Technology, class of 1917, and has been a member of the Worthington organization since 1920. George Gellhorn, Jr., succeeds Mr. Strong as manager of the export division.

❖ ❖ ❖

J. E. MULLER, manager for New York, Albany and Cambridge divisions of the Wheeling Corrugating Co., Wheeling, W. Va., has resigned his position. He formerly developed western Pennsylvania for the company.

❖ ❖ ❖

FRANK P. SNYDER, formerly sales engineer for the De Vilbiss Co., has been appointed sales representative in Detroit for the Alexander Milburn Co., Baltimore.

❖ ❖ ❖

RAYMOND PERRY, vice-president of the Ingersoll Milling Machine Co., Rockford, Ill., spoke recently on "New Trends and Developments in Production Management" at a meeting of the manufacturing division of the Chicago section of the American Society of Mechanical Engineers. Mr. Perry is also vice-president of the American Management Society.

❖ ❖ ❖

WALTER A. JANSSEN, a native of Davenport, Iowa, was sworn in last Friday as chief of the Metals and Minerals Division, Bureau of Foreign and Domestic Commerce, Department of Commerce.

Mr. Janssen received his formal education in the elementary and high schools of Freeport, Ill., and was graduated from the University of Wisconsin where he specialized in mining, metallurgy, economics, and commerce.

Following graduation from the University of Wisconsin he was employed for a number of years in various branches of the metals and minerals industry.

Mr. Janssen entered the services of NRA Nov. 11, 1935, and later was appointed Deputy Administrator of certain mining, manufacturing and service codes. Subsequently the quarrying and non-metallic codes were assigned to his jurisdiction. After the NRA was terminated by a Supreme Court decision, Mr. Janssen remained with the Division of Industrial Analyses and directed the writing of a detailed history of the codes of which he had charge.

Mr. Janssen has a wide acquaintance in the metals and minerals industry and is a member of the American Foundrymen's Association, American Institute of Mining and Metallurgical Engineers, American Institute of Mechanical Engineers, Metallurgical Society of America, and other professional organizations.

❖ ❖ ❖

G. W. KNOTTS, district manager, United Engineering & Foundry Co.; B. G. PARKER, president, Youngstown Foundry & Machine Co., and A. J. WARDLE, president and treasurer, McKay Machine Co., were elected directors of the Youngstown Chamber of Commerce for three-year terms.

Structural Steel Booklet

AMERICAN Institute of Steel Construction is distributing copies of its "Standard Specification for the Design, Fabrication and Erection of Structural Steel for Buildings." The pamphlets are available for 10c. a copy at the institute's headquarters, 200 Madison Avenue, New York.

SEND FOR THIS BOOK ON *Safe* FLOORING

Sixteen pages of illustrations and data to show you where and how to reduce accident hazards and to save money on the maintenance of floors, walkways, stairs and platforms.

INLAND 4-WAY FLOOR PLATE

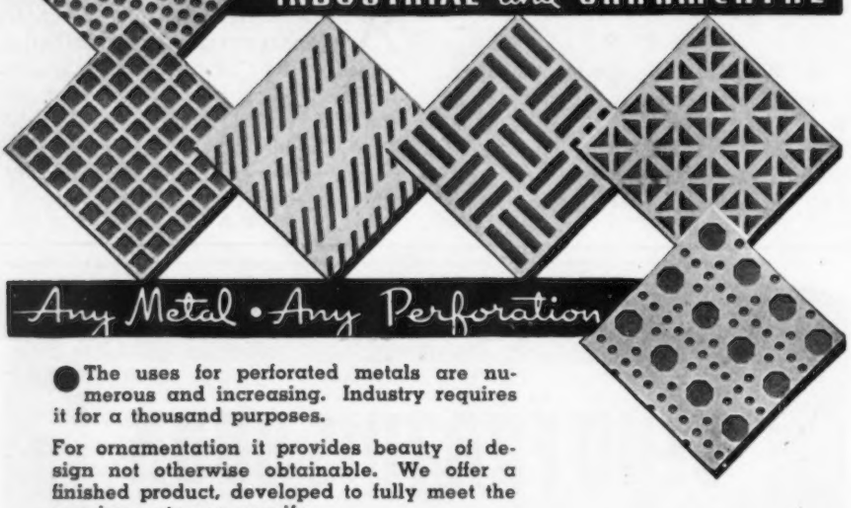
ROLLED BY INLAND STEEL CO.

38 SOUTH DEARBORN ST., CHICAGO

INLAND 4-WAY FLOOR PLATE is used in many of the country's largest industrial plants and public buildings, also on numerous kinds of machinery and equipment requiring steps, platforms and floor plates.

PERFORATED METAL

INDUSTRIAL and ORNAMENTAL



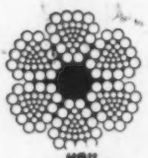
● The uses for perforated metals are numerous and increasing. Industry requires it for a thousand purposes.

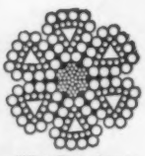
For ornamentation it provides beauty of design not otherwise obtainable. We offer a finished product, developed to fully meet the requirements you specify.

The Harrington & King PERFORATING Co.

5657 FILLMORE STREET—CHICAGO, ILL.
New York Office, 114 Liberty Street

Style B Flattened Strand


"8" Flattened Strand


Wire Rope Center

Steel Clad

You Can Depend On "HERCULES"* (Red-Strand) Wire Rope...

There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close cooperation with users.

—PREFORMED—

For maximum efficiency in Preformed Wire Rope, use Preformed "HERCULES". It is available in both Round Strand and Flattened Strand constructions

Made Only By

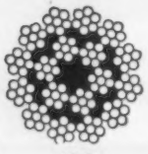
A. LESCHEN & SONS ROPE CO.

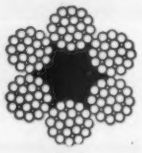
Established 1857

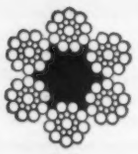
5909 KENNERLY AVENUE, ST. LOUIS, MO

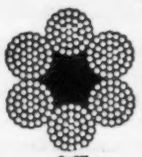
New York . . . . 90 West Street
Chicago . 810 W. Washington Blvd.
Denver . . . . 1554 Wazee Street
San Francisco . 520 Fourth Street
Portland . 914 N. W. 14th Avenue
Seattle . . 2244 First Avenue South

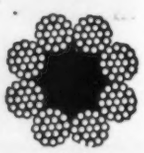
* Reg. U. S. Pat. Off.


18x7 Non-Rotating


6x19 Filler Wire


6x19 Seale


6x37 Extra Flexible


8x19 Extra Flexible

. . . OBITUARY . . .

PERCY C. DAY, vice-president and chief engineer of the Falk Corp., Milwaukee, died on Dec. 7, aged 63 years. He was an outstanding figure in the development of helical and herringbone gears, rolling mill and marine equipment, and had been with the firm since 1910. Mr. Day was born in England and received his technical education there, being graduated from Central Technical College, South Kensington, England, in 1894. After an association with the West Drayton Gear Works of the Power Plant Co. he came to America to develop gearing for the Falk Corp. Mr. Day pioneered in the electrometallurgical field in England, principally in electric furnaces and calcium carbide metals. He designed, built and operated the first commercial plant producing this chemical in Great Britain. He was a member of the American Gear Manufacturers Association, the American Society of Naval Engineers, and the American Society of Naval Architects.

❖ ❖ ❖

OSCAR C. R. ABEL, designing engineer of the Heil Co., Milwaukee, manufacturer of steel dump bodies for motor trucks, hydraulic hoists, etc., died on Dec. 4, aged 61 years. He joined the firm shortly after its establishment in 1909.

❖ ❖ ❖

WILLIAM C. KRONQUEST, retired superintendent of the Archer Avenue, Chicago, works of Acme Steel Co., died last week in Chicago, aged 62 years. In the employ of Acme since 1913, when he was hired as a clerk, Mr. Kronquest retired on a pension because of ill health in 1937. He was active in Masonic affairs in Chicago, and was at one time secretary and vice-president of the Medinah Country Club.

❖ ❖ ❖

WALTER E. WHITE, 53-year-old assistant chief engineer of Commonwealth & Southern Corp., died in an automobile accident on Dec. 5 while driving near Jackson, Mich.

❖ ❖ ❖

ERNEST J. BEYER, an executive officer and production manager of the Zenith Carburetor Division of the Bendix Aviation Corp. for 26 years, died Dec. 7 in Grace Hospital, Detroit.

❖ ❖ ❖

VICTOR R. BAUR, an official of the National Lead Co., was buried Dec. 7 at Detroit.

(CONTINUED ON PAGE 97)

Steel Shipments At 13-Month Peak

UNITED STATES STEEL CORP. subsidiaries shipped 679,653 tons of finished steel products in November, compared with 663,287 tons in October, a gain of 16,366 tons, and with 587,241 tons in November, 1937. Shipments for the first 10 months totaled 5,931,164 tons against 12,226,297 in the like period of 1937. The November shipments were heaviest since October, 1937.

Tool Engineers Chapter Organize At Rock Island

THE American Society of Tool Engineers' 23rd chapter was chartered Dec. 2, at Rock Island, Ill. To be known as the Tri-Cities Chapter, it will include the industrial district around Moline, East Moline, Rock Island, Ill., and Davenport, Ia. Fifty-five charter members elected Otto R. Reller, production manager, Moline Tool Co., as chapter chairman; Joseph B. Morganthall, chief tool designer, John Deere Wagon Works, vice-chairman; Kenneth C. Jasper, tool designer, Rock Island Arsenal, secretary; and W. Z. Fidler, chief draftsman of Reynolds Engineering Co., Rock Island, Ill., treasurer.

Carl A. Halborg, general manager, and W. A. Hart, chief engineer, Colonial Broach Co., Detroit, spoke at the last meeting of the Rockford Chapter, American Society of Tool Engineers. Lieut. Col. A. B. Johnson, Ordnance Department, U. S. A., will address the December meeting at Rockford, on "What Methods of Production Will be Used by the Government in Case of War."

Dun & Bradstreet to Survey Tax Burden

A NATION-WIDE survey now being made by Dun & Bradstreet, Inc., will yield answers to many tax questions in addition to continuing last year's Survey of Business Trends —estimates of 1938 sales volume in various trades and industries, and inventory investment at the close of the year. Is business forging ahead, holding its own or slipping backward? Have sales improved as much during 1938 as is generally reported? Are inventories being depleted or are warehouses and shelves still overstocked? About Jan. 1, 2,000,000 questionnaires on taxes will be mailed to every business concern listed in the Dun & Bradstreet's Reference Book.

but also clips, clamps, bent wire shapes, small stampings, and the like are produced in large volume by this company for manufacturers all over the United States. On these items, too, Gibson keeps close check on materials and specifications. Due to special equipment available in this large, modern plant, prices are very much "in line" and deliveries rapid. Try us for such parts!

WILLIAM D. GIBSON CO.

Div. of Asso. Spring Corp. 1800 Clybourn Ave., Chicago, Ill.

Services of our engineers available for design or redesign of springs, clips, small stampings, etc. Your inquiries invited.

ALLOY **HY-TEN** STEELS

ALLOY **S. A. E.** STEELS

Immediate Shipment from Six Warehouses

Reduce scaling, distortion, straightening with *Hy-ten "B" No. 3X .50 Carbon high Mn-Cr-Moly* alloy steel heat-treated before machining. This steel is readily machinable at 363 Brinell (38 Rockwell C) or higher.

Send for descriptive folder

WHEELOCK, LOVEJOY & CO., INC.

CAMBRIDGE CLEVELAND CHICAGO NEWARK DETROIT BUFFALO

. . . THE NEWS IN BRIEF . . .

Steel industry leaders commemorate twenty-fifth anniversary of discovery of stainless steel, hear metallurgist, research director, editor.—**Page 51.**

Light steel products represent 46 per cent of total output in third quarter, according to reports to American Iron and Steel Institute.—**Page 51.**

Bethlehem Steel Co. acquires some of assets of International Supply Co., expands oil country pipe warehouse facilities.—**Page 51.**

Thousand business leaders invited to formal opening of "Mill on the Hill," Carnegie-Illinois Steel Corp.'s new Irvin works.—**Page 51.**

Automobile production passes 100,000 (weekly) mark and may continue at around that figure at least through January. . . . Retail sales continue to gain.—**Page 52.**

Incentive taxation would result in broad gains in employment, plant expansion, Senate committee is told.—**Page 56.**

Navy Department approves designs for mosquito fleet of torpedo boats and submarine chasers.—**Page 58.**

Machine shops and foundries are not exempt under wage-hour law, Wage-Hour Administrator rules.—**Page 59.**

Government buying of steel under Walsh-Healy Act for latest reported week declines to $80,321.—**Page 59.**

Anti-Monopoly Committee is undecided on effects of patents after hearing testimony by automobile manufacturers.—**Page 60.**

War and Navy Departments will urge passage of legislation to build up stocks of manganese, other strategic materials.—**page 61.**

Wheeling Steel Corp.'s new galvanizing plant, with monthly sheet capacity of 5000 tons, is now under construction at Steubenville, Ohio.—**Page 62.**

NLRB rules Buffalo company must rehire and pay back wages to 31 employees.—**Page 62.**

Standards Bureau ends frameless-steel test.—**Page 62.**

American Institute of Steel Construction issues structural steel booklet.—**Page 67.**

Nation-wide survey of tax burdens on business to be undertaken by Dun & Bradstreet; 2,000,000 questionnaires to be mailed.—**Page 69.**

United States Steel Corp. shipments total 679,653 tons in November, 16,366 tons above October.—**Page 69.**

American Society of Tool Engineers charters twenty-third chapter at Rock Island, Ill.; Rockford chapter to hear Ordnance Department officer.—**Page 69.**

SECTIONS INDEX

Personals	63
Obituary	68
Steel Ingot Production	81
Summary of the Week	82
Comparison of Prices	83
Pittsburgh, Chicago, Cleveland, Philadelphia and New York Markets	84
Fabricated Steel	88
Non-ferrous Market	89
Scrap Market and Prices	90-91
Finished Iron & Steel	92-93
Pig Iron & Raw Material Prices	94
Warehouse Prices	95
Machine Tool Activity	97
Plant Expansion & Equipment	98

MEETINGS

Dec. 15—Grinding Wheel Manufacturing Association, Atlantic City, N. J.

Dec. 16—Abrasive Grain Association, Atlantic City, N. J.

Jan. 10 to 12—Institute of Scrap Iron and Steel, St. Louis.

Jan. 9 to 13—Society of Automotive Engineers, Detroit.

Feb. 14 to 17—Purchasing Agents Association, Indianapolis.

April 26 to 29—Electrochemical Society, Columbus, Ohio.

Toledo Scale Co. subsidiary acquires Defiance Machine Works, of Defiance, Ohio.—**Page 72.**

A. S. M. E. attracts 2400 to New York meeting.—**Page 72.**

Complete official text and duty rates of the United Kingdom and Canadian Reciprocal Trade Agreements in booklet form.—**Page 73.**

McKeesport workers offer wage cut for more hours.—**Page 73.**

Two railroads at St. Louis to buy shop equipment.—**Page 74.**

Aircraft parts firm is organized at Detroit by W. R. Angell, president of Continental Motors Corp.—**Page 75.**

Electro Metallurgical Co. plans to build new plant on 300-acre site near Sheffield, Ala., for production of ferroalloys, other products—**Page 73.**

Scrap Balers' Association to be formed Jan. 10, opening day of Institute of Scrap Iron and Steel convention.—**Page 73.**

Extruded Metals, Inc., is organized at Belding, Mich., for manufacture of brass rods, wire, other products.—**Page 73.**

Industrial leaders attend formal opening Carnegie-Illinois' new 44-in. slabbing mill at Edgar Thomson works.—**Page 74.**

Westinghouse Electric & Mfg. Co. salaries employees will be paid time and a half for overtime above 40 hr.—**Page 74.**

Machine tool sales picking up in some areas, contrary to expectations. Inquiries point to better volume in 1939.—**Page 97.**

Railroads could profitably expend $1,000,000,000 for equipment in next five years, Senate Finance Committee is told.—**Page 90.**

Construction awards in 37 Eastern states last month reached $301,679,000, the highest November total since 1929.—**Page 90.**

Public Contracts Board is swamped by protests of steel companies on wage minimums; U. S. Steel, Inland among opponents of board's action.—**Page 76.**

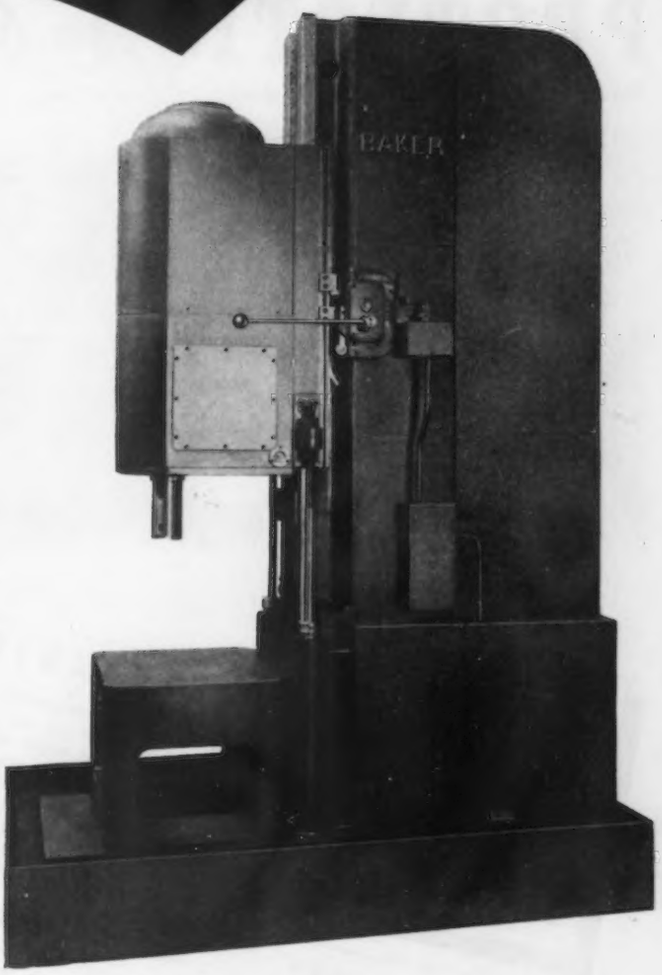
Do you need our figures?

You can find out how much it costs to perform drilling and boring operations with your present equipment. Do you know how much those same operations would cost with modern Baker machines?

If you compare these costs you can easily see if you can afford not to buy new Baker equipment. The volume of work anticipated will determine the amount of money you will save.

We will welcome the opportunity to investigate your problem. From a blue print or sample part, our engineering department can recommend or design the required machine. Further, they will give you cost figures which you can compare.

Baker standard machines are made in sizes to meet regular drilling, boring, and reaming requirements. Special machines are adaptations for volume production. Write Baker Brothers, Inc., Toledo, Ohio, or 1060 Broad St., Newark, New Jersey.



No. 26-H O single spindle machine arranged with 15 H. P. capacity pickoff gear head. One of the complete line of standard Baker heavy duty drilling machines.

★ BAKER ★

A. S. M. E. Meeting Attracts 2400 to New York

OVER 2400 members and guests attended the fifty-ninth annual meeting of the American Society of Mechanical Engineers, held in the Engineering Societies Building in New York, Dec. 5 to 8. Gerard Swope, president of General Electric Co., delivered the Towne Lecture on Tuesday evening under the title, "Mechanical Engineering—Men, Materials and Methods." A. G. Christie, professor of mechanical engineering, Johns Hopkins University, assumed the presidency of the society, following the retirement of Dr. Harvey N. Davis, president, Stevens Institute of Technology.

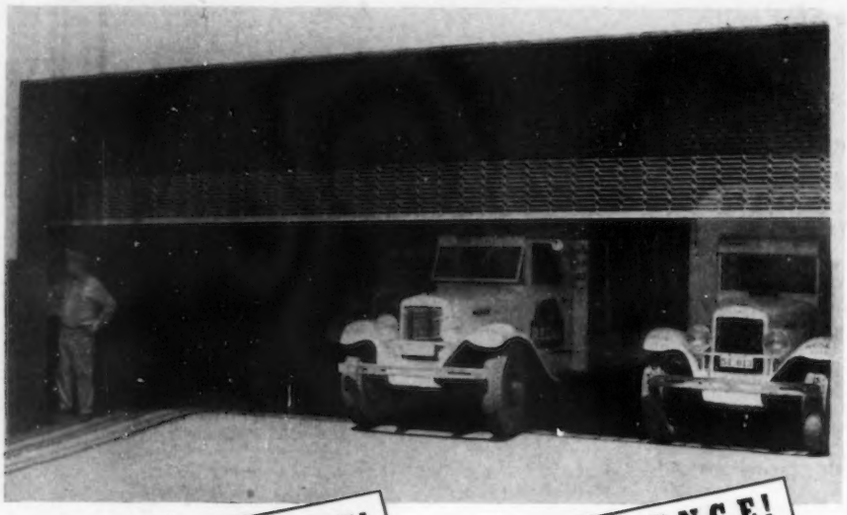
Two papers were presented on the application of hydraulics to machine tools, one by K. R. Herman, vice-president, Vickers, Inc., the other by Paul S. Jackson, Rockford Machine Tool Co. Mention was made of hydraulic turbines operating at speeds of 50,000 to 75,000 r.p.m. Mr. Jackson predicted the further application of hydraulic power to all types of metal cutting machines. Another paper relating to machine shop practice was presented by Prof. O. W. Boston, W. W. Gilbert and L. V. Colwell, of the University of Michigan, and related to the effects of size and shape of cut upon the performance of cutting fluids when turning SAE 3140 steel. A preview summary of this paper appeared in a digest of Professor Boston's work that appeared in the Oct. 13 issue of THE IRON AGE.

Joseph Winlock, chief metallurgist, and R. E. Leiter, assistant metallurgist, Edward G. Budd Mfg. Co., presented experimental evidence to show that the relatively high elastic resistance of low-carbon steels as measured in tension tests is the upper yield point, a theory that is believed to be of fundamental importance in the Luder's line phenomena. The properties of various types of hard surfaces and their application in industry obtained by 18 different hard surfacing processes was discussed by Prof. Myron L. Begeman of the University of Texas.

In a session devoted to education and training, Warner Seely, secretary, Warner & Swasey Co., spoke on the cost of apprenticeship and its value to his company. Ray D. Smith, president, Refrigerating and Air Conditioning Institute, in speaking of industrial training in his industry indicated that correspondence school courses have assisted many men in their work and careers. Some institutions are supplementing this education by mail with practical training in the shop or laboratory. Mr. Smith also described the use of psychological tests in the selection of students for training courses.

PROTECTION *Plus!*

Have *You* Checked the Advantages of Kinnear Rolling Grilles?



PROTECTION!

The Kinnear Rolling Grille provides convenient, positive protection against intruders. It is formed of strong, solid steel bars assembled in heavy, pressed-steel links. The ends of the grille are securely locked in steel jambs. It defies the usual intruder's tools.

CONVENIENCE!

Coiling compactly above the opening, it is out of the way and out of sight when opened, but can be lowered and locked in place in but a few seconds. It is counterbalanced for rapid, easy manual operation. Also, it can be equipped for motor operation and remote push-button control.

LIGHT, AIR, VISION!

The Kinnear Rolling Grille keeps intruders out, yet admits light and air, and does not obstruct vision. Its steel links and bars form an unusually attractive design that looks well with any type of architecture. It is an all-metal protective device that is practically transparent.

ECONOMY!

Because the Kinnear Rolling Grille operates vertically, it saves valuable floor and wall space. It is ruggedly built, and engineered for permanent, carefree service as well as economical installation. Its maintenance cost is negligible! And every grille is especially built to meet the exact needs.

The **KINNEAR** *Manufacturing Company*

1760-80 FIELDS AVENUE, COLUMBUS, OHIO

Toledo Scale Buys Defiance Machine Works

TOLEDO—The purchase of Defiance Machine Works by Toledo Precision Device, Inc., a subsidiary of Toledo Scale Co., has been announced. The Defiance plant, which was started in 1850, gives the Toledo Scale Co. and its allied interests modern foundry facilities which will enable them to seek a greater market for heavy machines and precision equipment. Don W. Champlin, New York industrial engineer, will be general manager of the Defiance plant.

Electro Metallurgical to Build Plant in Alabama

ELECTRO METALLURGICAL CO., 30 East 42nd Street, New York, has plans for initial unit of new plant near Sheffield, Ala., on a 300-acre tract, and has arranged with Southern Railway for construction of a six-mile line to plant site for connection with main system of railroad at Hopgood Crossing. Plant will be equipped to produce ferroalloys, calcium carbide and allied specialties, and will include electric furnace units, power substation and other manufacturing equipment. Electric power for plant service will be furnished by TVA.

Scrap Balers' Association Will be Organized

SCRAP dealers who are manufacturers of No. 2 hydraulic compressed bundles will hold a special conference on the afternoon of Jan. 10, the opening day of the 11th annual convention of the Institute of Scrap Iron and Steel, Inc., at the Hotel Jefferson in St. Louis, to consider the formation of a Scrap Balers' Association. S. H. Bassow, of Bassow Brothers, New York, will preside.

Baling presses are now operated in 113 yards in the United States, according to the institute.

McKeesport Workers Offer Wage Cut for More Hours

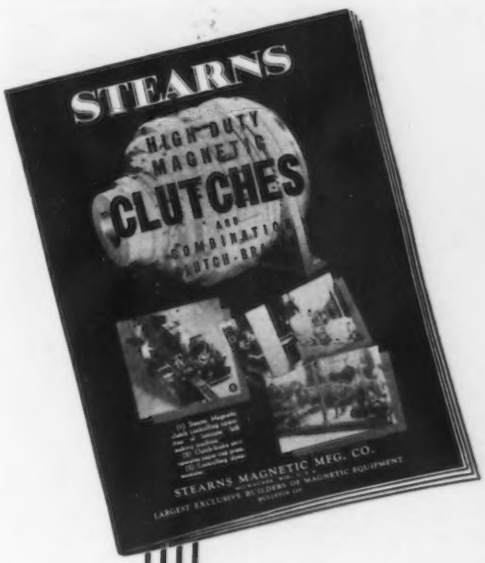
PITTSBURGH.—A group of McKeesport Tin Plate Corp. employees have offered to accept a wage reduction in exchange for a guarantee of more work. The issue was discussed at a mass meeting of workers. SWOC leaders, who have a contract, are opposing wage revisions.

Extruded Metals, Inc., Formed In Michigan

BELDING, Mich. — Organization of a new firm at Belding, Mich., to be known as Extruded Metals, Inc., has been announced. Plant and property have been purchased and machinery and equipment is being installed for the production of brass rods, wire, extruded architectural bronze and extruded aluminum. J. L. Barrett, formerly manager of extrusion activities of Bohn Aluminum & Brass Corp., is president. W. Harvey Smith, formerly on the plant management staff of Bohn, is vice-president in charge of operations. R. E. Watson, formerly Bohn general manager, is secretary-treasurer. Included on the board of directors are Grant L. Cook, attorney; E. J. Whyte and W. B. Freidinger of Frankenmuth Brewing Co.; Lloyd Diehl, president of Detroit Gasket & Mfg. Co.; E. W. Diehl, secretary-treasurer, Detroit Gasket & Mfg. Co., and Fred G. Richardson, president, F. L. McLaughlin Co. and Mt. Clemens Metal Products Co. Sales representation will be established in principal cities.

Trade Pact in Booklet

THE complete official text and duty rates of the United Kingdom and Canadian Reciprocal Trade Agreements have been prepared in convenient booklet form in the pocket-size December issue of the *American Import and Export Bulletin.* Copies can be obtained by sending $1 for each copy to the publishers at 420 Lexington Avenue, New York.



SOLVING YOUR CONTROL PROBLEMS

STEARNS High Duty Magnetic Clutches, Brakes or Clutch and Brake Combinations are the result of better engineering, backed by many years of practical, pioneering experience.

Consult a STEARNS Specialist in magnetic friction devices if you have a problem in near or remote control either in your plant or in your product.

OUR NEW CATALOG, BULLETIN 225, IS FULL OF INTERESTING INFORMATION ON THE SUBJECT. WRITE FOR IT.

STEARNS MAGNETIC MFG. CO.

SEPARATORS DRUMS ROLLS CLUTCHES BRAKES MAGNETS

HIGH STEARNS DUTY

LARGEST EXCLUSIVE BUILDERS OF MAGNETIC EQUIPMENT

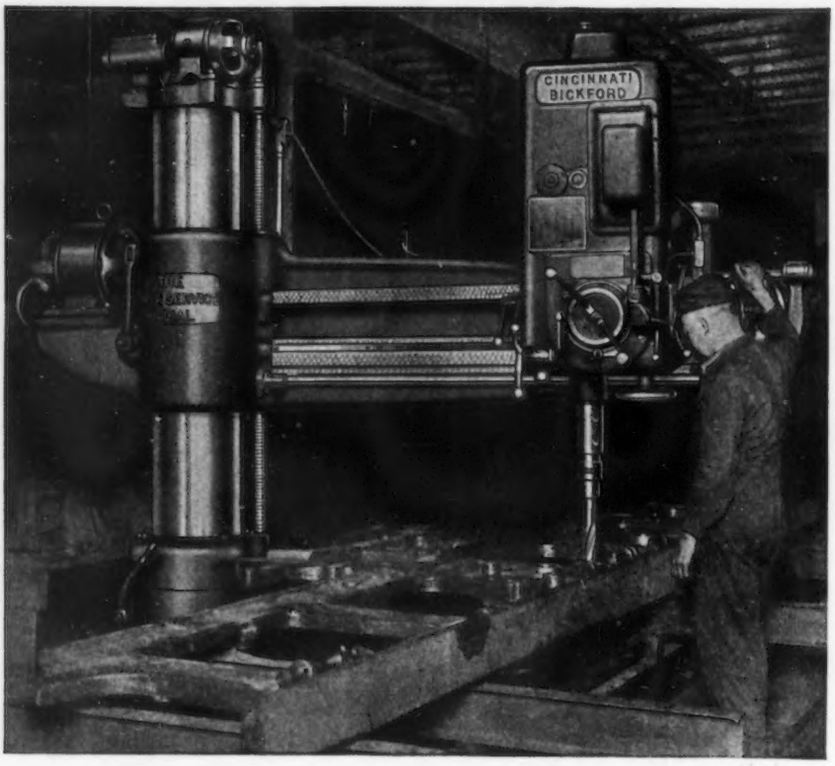
635 So. 28th Street **Milwaukee, Wis.**

Two Railroads at St. Louis To Buy Shop Equipment

ST. LOUIS.—Two railroads with headquarters in St. Louis have submitted their 1939 budgets to the Federal Court here for approval, the proposed expenditures including the following machine tool items:

St. Louis-San Francisco: abrasive pipe cutting machine, to cost $2157; Brinell hardness testing machine, $425; three Hollowell piston rod pullers, $505 each and the motorization of one each 24-in. lathe, $370; 24-in. shaper, $230; 14-in. lathe, $208; 24-in. shaper, $427; 36-in. drill, $240, and wheel lathe, $538 and also gasoline driven caterpillar crane, with 40-foot boom, $9000.

St. Louis Southwestern: for Illmo, Mo.: two air-operated jacks, 100-ton, $1000; Malden, Mo.: 24-in. lathe, $6000; Pine Bluff, Ark.: 1½-in. triple bolt cutter, $3700; emery wheel, $320; 300-amp. electric wedler; two-ton electric hoist for carwheel journal turning lathe; power reed rip saw, $1378; two 100-ton air jacks; cylinder boring bar, $826, three individual blowers, $1095; and small tools for locomotive and car departments, $3000; Tyler, Tex.: one speed drill for tool room, $232; Jones & Lamson or similar make turret lathe, $8406; two 50-ton air operated jacks, $1037; oxy-acetylene outfit, $262; equip two air-operated blacksmith forges with 3-hp. motors and independent fans, $520; equip small annealing furnace with 7-hp. motor and independent fan, $450; small miscellaneous tools for locomotive and car departments, $2750. All of the items on this list are carry-over items from the 1938 budget.



Convenient Low Controls
At the Head
Essential For Work Like This

Especially on big work centralized control at the drilling position makes important savings. Controls for all speeds and feeds—electric column clamping—arm clamping and elevation to the arm—power rapid traverse—controls for these and all other operations of the SUPER SERVICE RADIAL DRILLS are always within easy reach from the drilling position. Think what time and energy are wasted when that is not the case! Yet most of the radial drills in use today do not have this money saving feature of 100% centralized control at the head. Do yours?

Write for Bulletin R-24.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

Westinghouse Salaried Workers Paid Overtime

ANTICIPATING by three years the final provision of the Labor Standards Act, the Westinghouse Electric & Manufacturing Co. will begin paying time and a half for overtime immediately to all salaried non-exempt employees working in excess of 40 hr. a week.

This was announced by George H. Bucher, president, who estimated about 12,000 salaried employees will benefit. The plan will be made retroactive to Oct. 24, when the act went into effect. The law specified that overtime must be paid now to all non-exempt employees who work more than 44 hr. a week. The hours are to be reduced to 42 next year, and 40 in 1940.

350 Attend Opening of Edgar Thomson Mill

BRADDOCK, Pa.—More than 350 industrial and civic leaders of this community attended the formal opening of Carnegie - Illinois Steel Corp.'s new 44-in. slabbing mill at Edgar Thomson works on Dec. 13. The giant roughing mill will supply slabs for the new Irvin plant located six miles away. Rated at well over 1,000,000 tons annually, the mill embodies the latest in design and development in slabbing equipment. (Details on mill appeared in THE IRON AGE, issue of June 2, 1938).

Phoenix Ice Machine Co. has changed its corporate name to the Phoenix Machine Co., the organization's name when it was founded in 1907. Capital has been increased from $75,000 to $100,000. The name was changed because of the variety of machine building that is being done.

Aircraft Parts Firm Organized at Detroit

CONTINENTAL Aeronautic Corp., organized by W. R. Angell, president of Continental Motors Corp., has leased a 23½-acre site, containing a factory, for manufacture of metal wings, wing tips, spars and braces. E. J. Rivers, former executive of North American Aviation, Inc., will be vice-president in charge of production and G. O. Noville, a member of the Byrd expeditions, will be vice-president in charge of sales. W. R. Angell, Jr., will be a vice-president and R. M. Allan will be secretary-treasurer of the company, which will make an initial investment of $560,000.

. . . PIPE LINES . . .

Portland, Me., will take contractors' bids until Dec. 16 on 15,095 ft. of 8-in., 8530 ft. of 12-in. and 4260 ft. of 16-in. federal class 150 pipe.

Kennebunk-Kennebunkport-Wells, Me., district trustees will close bids Dec. 15 on 4700 ft. of 12-in., 2800 ft. of 10-in., 8200 ft. of 10-in. outside wrapped, all cement lined, and 850 ft. of 8-in. and 550 ft. of 10-in. metropolitan joint pipe.

Procurement Department has placed 3760 ft. of 8-in., 120 ft. of 6-in. and 2900 ft. of 8 and 12-in. pipe for two Springfield-Wilbraham, Mass., jobs with United States Pipe & Foundry Co.

Newport, R. I., is taking contractors' bids until Dec. 16 on 4750 ft. of 12-in., 6000 ft. of 8-in. and 1750 ft. of 6-in. federal class 150 pipe. Frank A. Barbour, 1119 Tremont Building, Boston, is engineer.

Framingham, Mass., will take bids until Dec. 23, on about three miles of pipe at an estimated cost of $82,000.

Yarmouth, Me., Yarmouth Water District trustees, will take bids until Dec. 20 on 2000 ft. of 10-in. pipe.

Hamden, Conn., is in the market until Dec. 19 for 1000 ft. of 10-in. pipe.

New Britain, Conn., will take bids until Dec. 20, on about $95,000 of various sized pipe.

Board of Wyandotte Township Commissioners, Wyandotte County, Kan., care of W. B. Brown, Occidental Life Building, Kansas City, Kan., attorney and representative, will begin work soon on 51 miles of pipe lines for water system in township, with pumping stations and main operating facilities in Edwardsville and Lake-of-the-Forest areas. Cost about $1,190,000. Financing has been concluded through Federal aid. Charles A. Haskins, Finance Building, Kansas City, Mo., is consulting engineer.

Wink, Tex., closes bids Dec. 19 for pipe lines for water system extensions and improvements; also for pumping equipment. Cost about $43,000, of which $25,363 represents a Federal grant. Koch & Fowler, Great National Life Building, Dallas, Tex., are consulting engineers.

Nowata, Okla., asks bids until Dec. 23 for pipe line extensions in water system; also for centrifugal pumping unit and accessories. Cost about $24,000. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are consulting engineers.

Payette, Idaho, plans about 2500 ft. of 10-in., 1000 ft. of 8-in., and 2400 ft. of 4-in. pipe, with valves, fittings, etc., for extensions in water system. Financing is being arranged through Federal aid. G. P. Lattig is city engineer.

Finley, N. D., asks bids until Dec. 19 for pipe lines for water system; also for 50,000-gal. storage tank and other waterworks installation. Cost about $46,500, of which $21,661 represents a Federal grant. Dakota Engineering & Construction Co., Valley City, N. D., is consulting engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 23 for 9600 ft. of cast iron soil pipe; also fittings (Schedule 3405).

Beaverton, Mich., closes bids Dec. 19 for 5400 ft. of 2 to 6-in. pipe for water system; also for 50,000-gal. elevated steel tank and tower. J. D. Sullivan, Alma Savings Bank Building, Alma, Mich., is consulting engineer.

Chariton, Iowa, asks bids until Dec. 21 for pipe lines for water system, and 250,000-gal. elevated steel tank and tower. Cost about $50,000. W. L. Perkins, Chariton, is engineer.

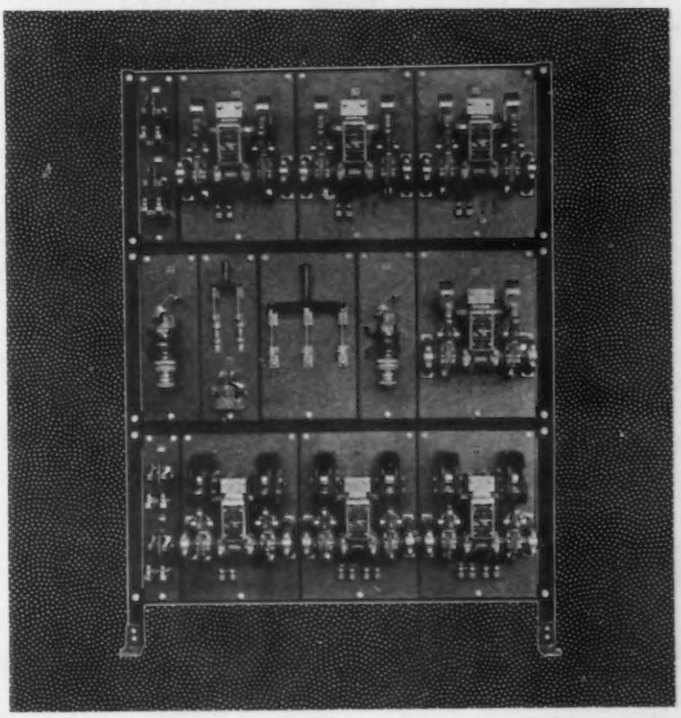
Bryan, Tex., plans pipe lines for extensions in water system; also development of new wells for water supply, two reservoirs of 3,000,000 and 500,000-gal., respectively, aeration equipment and other waterworks installation. Cost about $445,000, of which $200,000 represents a Federal grant. R. G. Williams is city manager.

Sweet Home, Ore., water distribution system construction has been awarded to Johnson Construction Co., Vancouver, Wash., which has purchased 300 tons of 2 to 10-in. pipe and fittings from United States Pipe & Foundry Co., San Francisco.

Jacksonville Highway Water District, Medford, Ore., water distribution system will require 170 tons of 4, 6 and 8-in. pipe, purchased from United States Pipe & Foundry Co., San Francisco.

Corvallis, Ore., pipe line from Rock Creek to Baldy Butte reservoir will require ap-

Quick-Stop-by-Plugging
for A. C. Wound Rotor Motors



EC&M Frequency Relay Magnetic Control provides a new, highly efficient method of operation for this type of drive. Frequency relays regulate acceleration automatically, cutting out rotor resistance only when it is necessary to maintain motor torque at its pre-determined value. And a frequency relay of the same type as used for acceleration but designed to operate exactly at the zero-speed frequency is used to open the reverse torque contactor at the instant the motor comes to rest. This is a distinct forward step in quick-stop-by-plugging control.

THE ELECTRIC CONTROLLER & MFG. CO. E&M CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS

THE ELECTRIC CONTROLLER & MFG. CO.
2688-A East 79th St., CLEVELAND, OHIO

Gentlemen:

Please send me further information on Quick-stop-by-plugging Control for a .... HP .... Volt .... phase .... cycle wound rotor motor.

NAME.....

COMPANY.....

ADDRESS.....

proximately 2300 tons of 16 and 20-in. pipe if cast iron is chosen. Bids close Dec. 19.

Hazelwood Water District, Portland, Ore., D. A. Chambers, 10546 N.E. Fargo Street, president of water board, plans about 32,000 ft. for water system; also 125,000-gal. steel standpipe and other waterworks installation. Cost about $72,000. Leonard C. Newman, American Bank Building, is consulting engineer.

Montrose, Colo., has awarded pipe for water distribution system to Hendrie & Bolthoff Mfg. & Supply Co., Denver.

Hazelwood Water District, Portland, Ore., asks bids Dec. 22 on $60,000 water system.

Hillsborough, Cal., has taken bids on 700 tons of pipe and fittings for water system extension.

Contracts Board Swamped by Protests of Steel Companies

WASHINGTON. — Confronted with an unprecedented volume of protests from all parts of the iron and steel industry, representing the vast bulk of its tonnage, Administrator L. Metcalfe Walling of the Public Contracts Board has extended to Dec. 19 the date for filing briefs and set Dec. 20 for hearing oral arguments in the minimum steel wage case. Previously the date for filing of briefs had been extended to Dec. 10 from Nov. 28.

The time allotted to each party for argument, the Administrator's announcement said, will be determined on the basis of appearances filed, but that in no event will more than one hour be given to each party. Arguments, it was said, must be limited to evidence "now of record," indicating that requests for presenting additional evidence by reopening the case had been definitely denied. A number of briefs had urged reopening in order to supplement evidence, while others presented additional data.

The arguments will be made before a representative of the Secretary of Labor and not before the board, it was announced at the Secretary's office.

U. S. Steel Files Brief

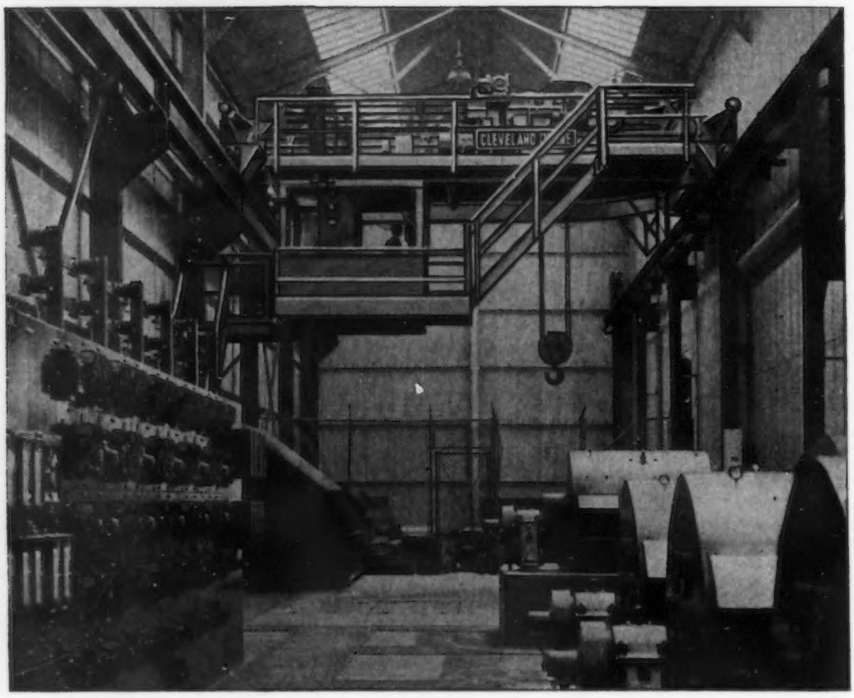
With the filing of some 20 individual and joint briefs and statements representing about 40 steel companies, ranging in size from the United States Steel Corp., down to the smallest producers, numerous and strong objections were made to the recommendations of the majority of the board to divide the country into only two steel wage districts—the North (36 states) with a minimum hourly rate of 62.5c. and the South (12 states) with a minimum hourly rate of 45c.

A number of small companies insisted that if minimum wages for the industry were fixed that the board adopt the recommendations made in a minority report of O. R. Strackbein, though some Southern interests objected to the 45c. rate being recommended for a group of states in that section. In all Mr. Strackbein proposed that five wage districts be established and recommended continuance of the Eastern rate of 56.5c. Insistence by Eastern producers that this latter rate should not be increased to 62.5c. was particularly emphatic. This gave strength to reports that the board might modify its recommendations more in accordance with the minority than with the majority report. However, final action rests with Secretary of Labor Frances Perkins. What she may do manifestly is only conjectural.

The SWOC, which instituted the case, has always received Secretary Perkins' support and its demands were

CLEVELAND CRANES

All Welded for Every Industry



• A 10 Ton short span Cleveland All Welded Crane in a Steel Mill Power House. It should be Cleveland Cranes, whether your requirements are for continuous hard service or stand by needs.

ALSO BUILDERS OF

CLEVELAND TRAMRAIL

THE CLEVELAND CRANE & ENGINEERING CO

1115 Depot St.

WICKLIFFE, OHIO

NEW YORK • DETROIT PITTSBURGH • CHICAGO

MATERIALS HANDLING EQUIPMENT

met and even exceeded by the majority report, which, instead of proposing a minimum rate of 60c. for the Far West, included it with the Northern district to take a rate of 62.5c.

Large Companies Protest

While the most concerted and forcible protests against the majority recommendations have come from small steel companies, larger producers also entered objections.

Small companies commonly maintained that: The majority recommendations, if adopted, would promote monopoly in favor of the large, integrated steel companies and crush the former; the board ignored the Walsh-Healey Act in arbitrarily dividing the country into two wage districts instead of proposing the minimum rate currently prevailing in localities; it erred in assuming that there is nationwide, rather than local, competition in the industry; it had acted on insufficient evidence, or had not made an adequate study of the record; its recommendations, if effected, would bring disaster upon the economic structure of the entire nation, a point emphasized by Donald R. Richberg, former NRA Administrator and steel code member, speaking as counsel for the Sheffield Steel Corp., Kansas City; it should adopt the minority recommendations if any are to be promulgated; it should dismiss the case entirely because there is no justification for fixing minimum steel wages, since they already exceed requirements of the act; its recommendations conflict with regulations under the PWA and the Bacon-Davis Act (the latter covering wages for Government construction) which provide wages for localities rather than by large districts; its implied suggestion for exemptions and exceptions is impractical since it is unlikely that the necessary certification by Government purchasing would be forthcoming or because requests for exemptions and exceptions be so great that the Secretary of Labor would have to deny them.

Fears Freezing of Rates

Inland Steel Co. told the board in a letter that the recommended minimum wage of 62.5c. would not be a matter of immediate embarrassment to the company because it is already paying that wage but expressed the view that the principle involved by which the board arrived at its recommendations was "altogether wrong."

At the moment, the letter said, the company is paying the 62.5c. minimum because it is able to do so without impairing its solvency but changing business conditions may bring about a condition whereby to continue paying that rate may cause the company to undergo a succession of losses.

"We believe that the introduction into our economy of rigidities in price or wage levels through the medium of administrative orders is not consistent with the orderly management of business under a competitive system," the letter said.

Also sent to the board along with the Inland letter was an opinion of the wage ruling given the company by two economists on the staff of the University of Chicago, Prof. R. W. Stone and Prof. Frank H. Knight, who confined their criticism of the Public Contracts Act to its administration, pointing out that economists approve the welfare objectives of the law.

It was their view that as administered to date, the act constitutes "a serious impediment rather than an aid

"LICK THIS JOB AT ANY COST—"
SAID A BIG STEEL COMPANY
"ANY COST MEANS LOW COST TO ME—"
SAID WYANDOTTE
Wyandotte
the J.B. Ford Company

A large steel company was having trouble cleaning the threaded ends of steel pipe and steel couplings before acid zinc plating. Failure to remove the stubborn sulphur and lead base cutting compounds at the roots of the threads prevented the deposition of zinc.

"Lick this job," the steel company said to Wyandotte, "*at any cost.*"

A special Wyandotte Metal Cleaner went to work. For the first time the steel men smiled. They saw the roots of the threads come clean. And went on zinc plating with confidence, knowing that the problem had been solved.

An extraordinary job? Yes! These large couplings, many of them 36 inches in diameter, were cleaned in power washers and carried directly from the washers to the acid zinc plating bath. Naturally the steel men were *doubly satisfied*, because the problem was licked by Wyandotte at *ordinary, low cleaning cost.*

What is your metal cleaning problem? Your Wyandotte Service Representative will be glad to help you solve it. Call him today.

THE J·B·FORD COMPANY
WYANDOTTE MICHIGAN
DISTRICT OFFICES IN 26 CITIES

to business recovery and reemployment," and raises a barrier to a higher standard of living for the one-third of the population which is ill-fed, ill-housed and ill-clad as well as for the other two-thirds. Holding that the Government, particularly in the case of such basic industries as iron and steel, is bringing about further unemployment through such wage raising devices as the Public Contracts Act, the two university professors pointed out that the wage of 62.5c. prescribed would "be a mark of historical progress were it not attained at the expense of unemployment for a considerable part of the 10 to 12 million people still unemployed."

In another brief for the Inland company, counsel for Inland (Pope & Ballard of Chicago), referred to an interpretation issued by the board in July, 1937, under which any practice of reducing the net wage below the established minimum through the deduction of charity contributions, group insurance premiums or similar payments was prohibited. Counsel expressed the view that the ruling might face difficulties if tested in the courts. It must be presumed that the board was familiar with the practice prevailing in the industry of making community chest contributions and insurance premiums on account of the employees, the brief said in reference to the steel wage case.

The United States Steel Corp. subsidiaries told the board that a final determination of the matter should not be arrived at until further studies are made and asked that further hearings be held.

The letter reminded the board that the steel wage recommendations called for further study on (1) whether wages in tin plate mills should be the subject of separate findings; (2) the effect on competition in the industry for Government business of a 45c. minimum in the South and a 62.5c. minimum wage for the remainder of the country; and (3) the position of smaller companies with respect to requests for exemptions under Section 6 of the act. For these reasons, the letter asked that no wage determination be made before a complete study and investigation is made covering all relevant facts.

Like other Eastern producers, Lukens Steel Co., Coatesville, Pa., said that 52.5c. is the predominant base wage rate for mills in the East, 62.5c. for those in the Western district, and that the base rates of these two districts are "distinct and separate" from each other. The board was told that the company is in no position to absorb any increase in costs that would result from the proposed increase of approximately 11 per cent in its present minimum basic hourly rate from 56.5c. to 62.5c. In fact, the brief continued, with the present selling prices of products and present wages, "we do not see much hope, if any, for successful operations under present conditions."

Alan Wood Files

The Parkersburg Iron & Steel Co., Parkersburg, W. Va., protested against the inclusion of Parkersburg in the Northern area where it would be subject to a 62.5c. minimum rate under the board's recommendations.

The Alan Wood Steel Co., Conshohocken, Pa., said that the wage of 56.5c. should be applied to the so-called Eastern district of Pennsylvania and that if the rate of 62.5c. is adopted the company would no longer be able to compete successfully with other and more favored plants. It was insisted that the rate for the so-called smaller companies should not be fixed in any event until complete and final study of their position has been made.

The company asked that the minority report be adopted as the report of the board "to the end that the company may be permitted to continue in business and to enjoy Government contracts."

The Sheffield Steel Corp., through

S O S

Source of Supply

That's what the Duriron Company offers you—a Source of Supply for corrosion-resisting castings and equipment.

Alloys to meet these conditions or requirements are available to you:

For nearly all commercial acids, at all strengths and temperatures, including hot, weak sulfuric acid, hot muriatic acid, sulfurous acid, organic acids.
For caustic solutions.
For abrasion and erosion resistance.
Some of the alloys have tensile strengths up to as much as 150,000 lbs./sq./in.
Brinell hardness ranges from 120 to 600.
In weight, castings of high silicon iron up to 7,000 lbs. each can be procured; in the stainless steels, as much as 2,000 lbs. each.

Fabricated equipment, ready for use, includes centrifugal pumps good for 25 g.p.m. to 2,000 g.p.m., several types of valves, heat exchangers, heating and circulating steam jets, exhaust fans, pipe and fittings, and numerous other items of standard equipment.

Of course, no one alloy has the maximum of *all* the essential qualities. There is, however, one alloy that will meet the most important of your requirements, with a minimum of compromise of the other desired qualities.

Our Sales Engineers will be glad to discuss with you what we have to offer to your advantage.

Ask to have one of them call, or write direct and we shall be glad to make recommendations.

THE DURIRON COMPANY, Inc.
438 N. Findlay Street Dayton, Ohio

Mr. Richberg, declared that recommendations of the majority of the board would not only violate the purpose and spirit of the controlling act but would be disastrous to small steel companies and to the economic well being of the country.

"Assuming that the same policy be applied generally, the inevitable result would be a general appeal to Congress with the idea of correcting the resultant ends," Mr. Richberg declared.

Exemption Pleas Forecast

It was asserted that if the fundamental prevailing minimum wages are so fixed that injustice is done to a large number of individual plants the Secretary of Labor will be flooded with applications for exemptions and exceptions, "the very number and extent of which may impel the Secretary, in an attempt to preserve the recommendations of the majority report, to refuse such exemptions and exceptions, thus again visiting upon small business the original injustice which had its inception in an erroneous interpretation of subdivision B of Sec. 1 of the (Walsh-Healey) Act." This subdivision provides for fixing of a wage rate prevailing in a locality.

"If the Secretary will fix a reasonable 'local basis' for the ascertainment of prevailing minimum wages, in the first instance," Mr. Richberg continued, "a harmonious administration of the act, both upon the part of the Government and upon the part of the industry, seems sure to follow and to that end we respectfully submit this memorandum."

He proceeded to say that it seems to be clearly demonstrated that the majority of the board is asking the Secretary to fix a prevailing minimum wage based wholly upon what the great steel companies pay, without regard to the needs or problems of the smaller companies which are still struggling for existence in the industry.

"No more disastrous national and local result economically can be imagined!" it was emphasized.

"Localities" Ignored

The former NRA administrator said that if the board had given heed to the historical background and language of the statute it must have concluded that it was the prevailing wage, "not in great industries, not throughout the United States, that was directed, but the prevailing minimum wage 'in localities' of manufacture that Congress sought, and the action of the majority in ignoring the 'locality' situation is the fundamental reason for ignoring of the interests and wage bases of the small companies."

Citing NRA experience, Mr. Richberg said it has been shown that small plants in the steel industry cannot compete on even terms with the great companies in respect to equipment, machinery, financial backing and basic wages.

Vice-President J. H. Parker of the Carpenter Steel Co., Reading, Pa., said that the recommendation of 62.5c. an hour is not in accordance with the "finding of fact" nor with the law because the facts show that in the Eastern district—that is, the district east of Altoona—the prevailing rate is 56.5c. an hr. He said the rate for the Eastern district should not be in excess of the latter figure. The Carpenter Steel Co. said its wage for common labor is 57c. It was pointed out that aside from the injustice which would be worked on steel producers in the Eastern district if the rate were fixed at 62.5c., additional hardships would be put upon manufacturing concerns other than steel companies because common labor rates paid at steel plants always set the pace for common labor rates of other industries.

It was also stated that an increase in common labor rates means an in-

FOR **FASTER**

FLAT FILLET WELDING!

● Now you can speed up flat fillet welding on production work—with a new rod that produces a surprisingly smooth weld of unusually high ductility. ● You will be impressed with the way the metal flows from HI-TENSILE "G", with the very small spatter and slag losses and with the way the finished job stands inspection. Meets all A.W.S. specifications, Grade 10. ● Your local Page distributor will show you many advantages that HI-TENSILE "G" makes possible.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE COMPANY, Inc.
MONESSEN, PENNSYLVANIA

In Business for Your Safety

ACCO

PAGE *Welding* **WIRE**

crease to all the higher paid semi-skilled and skilled workers. Further declaration was made that "while in theory this recommended 62.5c. per hour . . . would apply only to Government work, the practical effect is that it would also apply to all commercial work, resulting in the further elimination of markets now served on a very slender margin."

Missouri's Industry Protested

Speaking through its executive vice-president, Elmer Donnell, the Associated Industries of Missouri, protesting the proposed 62.5c. rate, said that if the recommendations are adopted, Missouri and the immediately adjacent industrial districts of Kansas and Illinois will be placed at a competitive disadvantage with the more favorably situated and larger Chicago and other Northern steel mills and the low cost Southern mills. It was urged that these prevailing rates in the Missouri industrial area be given proper consideration.

The Laclede Steel Co., St. Louis, with plants at Alton and Madison, Ill., said that there is absolutely no occasion whatever at this time for determination of minimum wages in the iron and steel industry inasmuch as the evil which Walsh-Healey Act was designed to cover does not exist in the industry. The record, it was declared, shows that no steel company is receiving more than a fair share of Government contracts.

Striking a common note sounded in a number of protests, the Laclede company maintained that, if adopted, recommendations of the majority of the board would promote monopoly by favoring the larger, integrated companies. The company explained that it sells two-thirds of the volume either locally or in the territory in which the 45c. minimum is proposed to be paid.

PWA Act Cited

Like other protestants the company also made the point that recommendations ignored the regulations under the PWA and the Bacon-Davis Act which provides for the fixing of minimum wages for common labor by separate localities.

"Even if the criticisms of capacity to produce adopted by the board were correct," the brief said, "there is insufficient data in the record for which the board can find the prevailing minimum wages for small companies inasmuch as the findings of the board are that the total capacity of the small companies in the industry is approximately 3,555,000 tons; whereas the record shows the board has no information with respect to small plants with an aggregate capacity of nearly 2,000,000 tons or about 57 per cent of the total capacity of the small plants." (A small company was classified by the board as one with an annual ingot capacity of less than 300,000 tons.)

While urging that the proceedings should be dismissed, the Laclede company said that if minimum wages be determined, the case should be reopened so that evidence on areas of competition, localities, etc., can be submitted. The company said the recommendations of the minority "are sound, reasonable and should be adopted," if there is any occasion for determining the prevailing minimum wages in the industry.

Desvernine Backs Minority Report

Preservation of the Eastern wage district and the determination of the prevailing minimum wage of 56.5c. currently operating in that locality was asked in a statement filed by R. E. Desvernine, president of the Crucible Steel Co. of America. Mr. Desvernine said that the minority report more accurately recognizes the significance of the language of the act requiring the determination of "the prevailing wage — currently operating in the locality" and the data in the record dealing with the essential question of wage districts.

The board, it was declared, "in its wisdom" saw fit to geographically recognize the concentration of common labor rates at 45c. in the South which affects 13,195 employees, but completely ignored the significant consideration at 56.5c. "which admittedly affects a substantial part of the industry, 55,518 employees."

The Andrews Steel Co., Newport, Ky., said the report of the majority erred in construction placed on so many facts that it would be detrimental to the public welfare for the Secretary of Labor to adopt the majority report. The board was urged to withdraw the report and again review the facts presented, together with the constructive suggestion made to the board.

Point to Contracts

It was further urged that the board consider the union contracts that have been made between employer and representatives of employees as to the prevailing minimum rate before naming a minimum wage rate in any locality that will repudiate a legally negotiated contract which was urged upon the employer and had the approval of the Secretary of Labor.

It was added, however, that if the board, after further consideration, is of the opinion that a territorial division of the country is the only practical plan, then the division suggested by the minority report should be adopted.

The Andrews company also pointed out that the large companies in the North have the advantage of the "continuous mill process and can pay the 62.5c. rate because the mechanized equipment they operate will develop a much lower labor cost per ton at the 62.5c. rate than the lesser rate paid by the smaller mills will develop in a mill that is not mechanized."

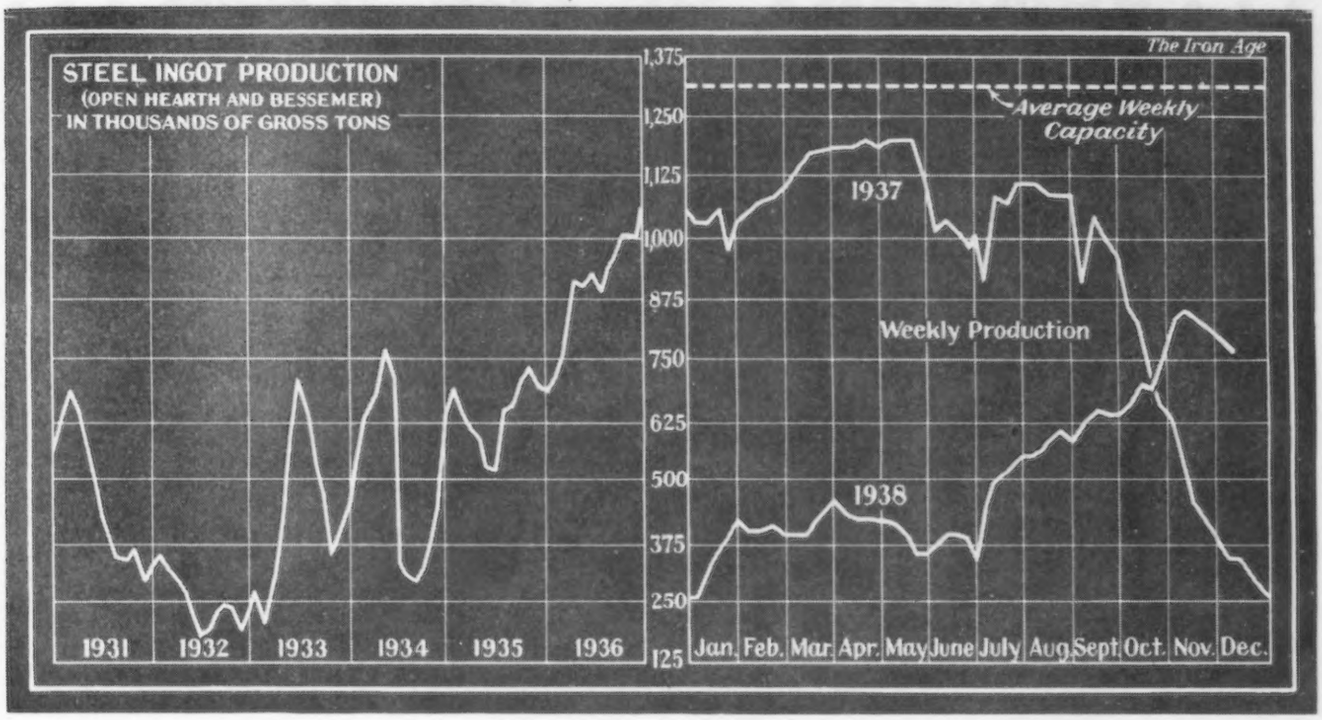
Pointing out that its common labor rate is 54c. the Rustless Iron & Steel Corp., Baltimore, said that an increase of 15.5 per cent to the proposed 62.5c. rate, or even of 10 per cent in the labor cost of all its products is too great a price to demand for the privilege of competing for Government business. Exemptions, it was stated, would give no relief to steel since it may be assumed that no head of a contracting agency or department of the Governmen would certify an exemption from the established rate to be necessary and competition would be limited to those companies in a position to pay 62.5c.

Brushing aside all annoying details and complications, SWOC's local lodge 1105, Amalgamated Association of Iron, Steel and Tin Worers, Indianapolis, would established a minimum wage of 62.5c. throughout the steel industry. The lodge's resolution committee notified the board that, with the lodge's approval, it had adopted a resolution to this effect.

Simonds Worden White Buys Springfield Company

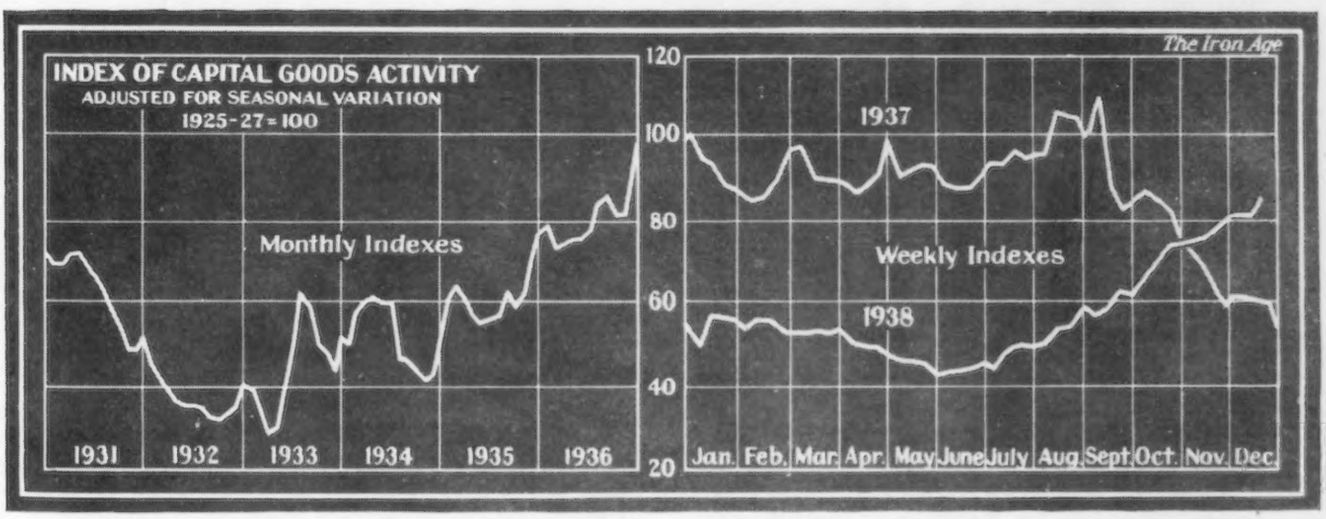
CLEVELAND.—Simonds Worden White Co., Dayton, Ohio, has purchased and will manage the Safety Grinding Wheel & Machine Co., Springfield. William H. Cool has been made vice-president and general manager under the new ownership.

Ingot Output Down Two Points to 58 Per Cent



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Wheel-ing	Buffalo	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	41.0	60.5	55.0	36.0	57.0	86.0	43.0	89.5	65.0	62.0	40.0	59.0	75.0	**58.0**
PREVIOUS WEEK..	43.0	59.5	65.0	37.0	64.0	79.0	48.5	87.5	60.0	66.0	40.0	59.0	95.0	**60.0**

Index Rises to 82.8 as Automobile Output Exceeds 100,000



WITH automobile production passing the 100,000 mark for the first time since the week of Aug. 14, 1937, THE IRON AGE index of capital goods activity advanced 2.4 points in the past week to 82.8, the highest index position since the second week of October 1937. The week's largest gain, after adjustment, was made by the automobile series which rose 4.9 points to 99.3. Declines in the output of steel ingots and in the volume of construction contracts were less than the normal seasonal experience causing the adjusted index of these two components to rise above the previous week's level.

	Week Ended Dec. 10	Week Ended Dec. 3	Comparable Week 1937	Comparable Week 1929
Steel ingot production[1]	95.4	92.8	41.3	96.2
Automobile production[2]	99.3	94.4	84.5	74.4
Construction contracts[3]	85.4	82.9	59.4	105.3
Forest products carloadings[4]	61.5	60.1	59.9	115.8
Production and shipments, Pittsburgh District[5]	72.5	71.9	57.6	104.5
Combined index	**82.8**	**80.4**	**60.5**	**99.2**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record*; 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . . .

. . . Railroad buying, though not large, features market.

° ° °

. . . Automobile makers expected to buy again shortly.

° ° °

. . . Operations off slightly; scrap composite higher.

THE railroads, which have been a relatively minor factor in steel business during the past year, are coming to the aid of the steel mills at a time when new business in other lines is affected by the year-end inclination to hold inventories to a minimum. Although railroad buying has not assumed major proportions, whatever has been placed or is in early prospect is clear gain as not much had been expected until some general solution for railroad ills had been found.

Foremost in railroad buying are rail orders totaling 41,250 tons, of which 25,000 tons has been placed by the Chesapeake & Ohio, 13,000 tons by the Norfolk & Western and 3250 tons by the Pere Marquette. Rail inquiries in early prospect are 80,000 to 100,000 tons from the Union Pacific and a sizable tonnage for the Southern Pacific.

Railroad equipment business also is more active. While the only important orders are 400 hopper cars placed by the Wheeling & Lake Erie and 15 Diesel-electric locomotives by the Reading-Central of New Jersey, the 2100 freight cars recently inquired for by the Norfolk & Western may be ordered shortly. In addition, equipment repair programs are taking more steel, 6400 tons of fabricated car parts for the Chesapeake & Ohio being an example. The St. Louis-San Francisco and the St. Louis-Southern have asked for court permission to spend $2,306,421 and $1,668,356, respectively, while the Missouri Pacific and Wabash are expected to submit budgets for court approval shortly.

Automobile companies probably will place orders before the end of the month or in early January for sizable tonnages. A forerunner of this business was the placing of about 20,000 tons this week by one Detroit company. Continued large consumption of steel for the manufacture of motor cars is indicated by the fact that present assembly schedules call for about 100,000 units a week through January at least and possibly well into February. Whether there is a temporary seasonal falling off in output at that time depends on the trend of retail orders, on which schedules are being based.

BEFORE the Dec. 31 deadline on PWA building construction projects a large volume of work will at least reach the stage of contract bidding. This week's lettings of fabricated structural steel were only 13,250 tons, but new projects total 23,500 tons. Reinforcing bar awards were 8000 tons with 25,000 tons in new projects, including 13,000 tons for a sewer in Boston, 2600 tons for a storage building in Chicago and 2000 tons for barracks in Hawaii.

Operations of the steel industry are sliding off gradually, being estimated at 58 per cent this week, down two points from last week, but not much further decline is to be expected over the remainder of the month. The usual slump in the week between Christmas and New Year's may be less than normal, possibly reflecting little more than the loss of one holiday, Christmas. It is indicated that there may be a last-minute rush of specifications for sheets and strip contracted for during the October price dip.

Steel companies are confident that by mid-January at the latest operations will be pointing upward again, aided by increasing releases for construction projects, railroad orders, resumption of tin plate production on a larger scale and the continuance of generous consumption by the automobile industry.

Although no formal price advances have been scheduled for the first quarter, some units of the industry will attempt to improve their net returns by the withdrawal of concessions. Makers of merchant wire products have withdrawn concessions, which amounted in some instances to about $5 a ton, and are quoting the published prices. Bolt and nut makers have also restored published quotations after temporarily withdrawing from the market. Reinforcing bar prices are also strengthening in some districts.

WITHOUT formal announcement, pig iron makers have opened their books for first quarter at unchanged prices. Ferromanganese prices have been reaffirmed.

Although steel scrap prices show signs of weakness in some districts, the Pittsburgh and Chicago prices are steady and the Philadelphia quotation is 50c. a ton higher, based on a moderate-sized sale to a mill. Thus THE IRON AGE scrap composite price has advanced 17c. to $14.92, within 8c. of its peak for the year.

Still wrestling with the problem of high costs and low prices, the steel industry, including both large and small companies, has poured protests into Washington against the wage rate decision of the Public Contracts Board of the Department of Labor, which, it is held, threatens the very existence of some of the less favored units of the industry.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Dec. 13, 1938	Dec. 6, 1938	Nov. 15, 1938	Dec. 14, *1937
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	43.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	43.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.25	2.25	2.25	2.45
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.25
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.70	2.70	2.70	2.90
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.80	2.80	2.80	3.00
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.15	2.15	2.15	2.40
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.95	2.95	2.95	3.20
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham.	3.50	3.50	3.50	3.80
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.15	2.15	2.15	...
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.20	3.20	3.20	...
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.45	2.45	2.45	2.75
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.90
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	3.20	3.20	3.20	3.40
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	†$5.35

*Pittsburgh prices only.
†Subject to post-season adjustment.

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$25.76
No. 2, Valley furnace	21.00	21.00	21.00	24.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	23.89
No. 2, Birmingham	17.38	17.38	17.38	20.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	24.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	25.26
Basic, Valley furnace	20.50	20.50	20.50	23.50
Malleable, Chicago†	21.00	21.00	21.00	24.00
Malleable, Valley	21.00	21.00	21.00	24.00
L. S. charcoal, Chicago	28.34	28.34	28.34	30.24
Ferromanganese, seab'd carlots	92.50	92.50	92.50	102.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$15.75	$15.75	$15.375	$13.75
Heavy melting steel, Phila.	**15.25**	14.75	14.75	14.25
Heavy melting steel, Ch'go	13.75	13.75	14.50	12.25
Carwheels, Chicago	12.50	12.50	13.00	15.00
Carwheels, Philadelphia	16.75	16.75	16.75	16.25
No. 1 cast, Pittsburgh	15.50	15.50	15.50	16.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	16.75
No. 1 cast, Ch'go (net ton)	12.50	12.50	12.75	12.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$4.00
Foundry coke, prompt	4.75	4.75	4.75	5.00

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Electrolytic copper, Conn.	11.25	11.25	11.25	10.25
Lake copper, New York	11.375	11.375	11.375	11.125
Tin (Straits), New York	*46.00*	46.25	46.50	44.125
Zinc, East St. Louis	4.50	4.50	5.05	5.00
Zinc, New York	4.89	4.89	5.44	5.35
Lead, St. Louis	*4.60*	4.70	4.95	4.85
Lead, New York	4.75	4.85	5.10	5.00
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	14.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
December 13, 1938	2.286 a Lb.	$20.61 a Gross Ton	$14.92 a Gross Ton
One week ago	2.286	20.61	14.75
One month ago	2.286	20.61	14.88
One year ago	2.512c.	23.25	13.42

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	High	Low	High	Low
1938	2.512c., May 17	2.211c., Oct. 18	$23.25, June 21	$19.61, July 6	$15.00, Nov. 22	$11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 16
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 23
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 17	13.08, Nov. 22

. . THIS WEEK'S MARKET NEWS . .

STEEL OPERATIONS

. . . Average rate drops two points to 58 per cent

THIS week's production of steel ingots is estimated by THE IRON AGE at 58 per cent of the country's capacity, down two points from last week.

Although production is lower in many districts, gains have been made in the CHICAGO, WHEELING-WEIRTON, DETROIT and BIRMINGHAM districts.

At CHICAGO there has been a gain from 59.5 to 60.5 per cent. The WHEELING-WEIRTON district has moved up five points to 86 per cent. The DETROIT district is up two points to 89.5 per cent because of an added open hearth furnace at the Ford plant. In the SOUTH there has been a gain of five points to 65 per cent because of the addition of one open hearth at Ensley, where rail orders have required the making of more ingots.

In the PITTSBURGH district operations are two points off at 41 per cent. Declines have also occurred in the CLEVELAND-LORAIN, YOUNGSTOWN, BUFFALO and SOUTHERN OHIO areas. The sharpest drops were 10 points at YOUNGSTOWN and seven points in the CLEVELAND-LORAIN district.

Blast furnace operations are beginning to taper in some districts in line with reduction of open-hearth melting.

The American Iron and Steel Institute on Monday estimated this week's ingot output at 57.6 per cent.

NEW BUSINESS

. . . Moderate leveling off, but prospects are improving

A FURTHER leveling off in new business at PITTSBURGH occurred during the past week. The decline, however, is being discounted as mostly of a seasonly nature, coupled with the fact that prices are to be unchanged in the first quarter of 1939. Potential structural steel business is piling up as the PWA deadline approaches. Additional rail and freight car tonnage is also expected to turn into firm contracts before the year-end or shortly after.

The recent receipt of moderate finished steel tonnages for delivery in January has strengthened the belief of CLEVELAND and YOUNGSTOWN producers that the first quarter of 1939 will bring a great improvement over the comparable period this year.

Railroad purchases for spring programs are coming out a little more freely than expected in view of the financial condition of the carriers. The haste to close projects involving Federal Government financing has helped sustain the markets for construction steel.

Mills remain under pressure for deliveries on cold rolled sheets. Incoming orders for flat rolled products are light pending the next automotive purchases.

Over recent months the merchant bar market has been one of the most satisfactory. Demand has been regular and prices have held up well in comparison with other products.

Steel requirements for the first section of the CHICAGO subway should be awarded within the week while tonnages needed for the second section, bids on which will be asked around the first of the year, will be published in next week's issue of THE IRON AGE.

Chicago sheet and strip mills anticipate more tonnages from the motor car industry before Jan. 1. It is understood that automobile production now is reflecting actual consumer sales, rather than dealer stock purchasing. Orders for about 20,000 tons were placed by a Detroit company this week.

Several indications point to increased railroad buying from steel mills next year. Some authorities believe the recent arrangement whereby a car builder aided in the financing of the purchase of 2000 cars will spread widely and will give banks an outlet for their excess reserves. If this be so, many roads now unable to afford new equipment will be in the market for cars even before their net earnings position would give justification. The Union Pacific has announced its intention of buying from 80,000 to 100,000 tons of rails in 1939.

At BIRMINGHAM a fair run of new tonnage continues and most mill units are producing at close to capacity. Wire products and sheets continue active.

BUFFALO steel producers are optimistic with respect to business prospects. A number of fair-sized projects are going up in the area and structural demand at present is pretty good. Bar demand is picking up.

New business in sheet steel is a trifle better in the southern Ohio district, while wire and rods have eased a bit.

An additional appropriation of $4,800,000 insures further construction at the Navy Air Base at Alameda, Cal. Tentative plans for next year include barracks, dispensary, and administration buildings of reinforced concrete construction, one or two hangars, and two storehouses. An expansion program at the Oakland, Cal., municipal airport may bring additional tonnage into the market in early 1939. Airport construction has been an important factor in the Pacific Coast market throughout this year.

PRICES

. . . Efforts to strengthen weak quotations are being made

ALTHOUGH published prices of steel products are unchanged for the first quarter, there will be some lifting of quotations on those products that have been subject to concessions during recent months. Following the action of bolt and nutmakers in withdrawing all outstanding low quotations and substituting therefor the published quotations, the makers of merchant wire products have taken like action.

A firmer tone in reinforcing bar prices is reported from CHICAGO, where a considerably larger volume of work is undoubtedly responsible. There has also been some strengthening of quotations in other districts.

Quotations on fabricated structural steel are generally low. Galvanized roofing is subject to concessions in some areas, but prices on plain galvanized sheets show improvement.

While many of the pig iron producers have made no formal announcement of first quarter prices, they have opened their books for the period at unchanged quotations.

PIG IRON

. . . Books open for first quarter orders at unchanged prices

MOST of the pig iron producers throughout the country have opened their books for first quarter orders without making a formal announcement. While there have been some sales for first quarter delivery,

no buying movement of importance is in sight.

Ferromanganese makers have reaffirmed present prices for the first quarter and so have the makers of silvery iron in Jackson County, Ohio.

Shipments of pig iron this month have been retarded somewhat by consumers, who are trying to hold down year-end inventories. However at CHICAGO it appears that November shipments will about equal those of November, though present figures show a decrease of about 8 per cent, and there has also been that much decrease in foundry coke shipments in that area. Inventories of many melters are believed to be low, which possibly will bring about a better movement of iron beginning in January.

SEMI-FINISHED STEEL

. . . Consumers' inventories low . . . Shipments smaller

BOOKINGS at PITTSBURGH in the past week leveled off somewhat. Shipments from now until the end of the year are being held to a minimum by consumers. In view of the heavy tonnages placed in the past several weeks, current business is as good as, if not better than, expected. Consumers' inventories are exceptionallly low, with the result that a market improvement in general business conditions would be immediately reflected on mill order books.

STRUCTURAL STEEL

. . . Heavy inquiries on PWA projects highlight market

INQUIRIES were pouring out this week owing to the approach of the Jan. 1 deadline for PWA projects, and a sharp increase in awards is anticipated before that date. Volume of contracts placed during the last few days was lower. In the NEW YORK area, where 16,500 tons for the New York Criminal Courts building is to be let momentarily, new projects total about 4000 tons.

American Bridge Co. was awarded 1740 tons for an Air Corps school building at Chanute Field, Ill., in the CHICAGO area, where a slight improvement in fabricated shape contracts is noted, and will furnish 1500 tons for reconstruction of the Williamsburg Bridge roadway, New York. Contracts for 1100 tons of material for the Grand Coulee Dam, Washington, have been placed. SAN FRANCISCO reports that Ford Motor Co. has taken 1500 tons of H-piles for reconstruction work at Long Beach, Cal., that framework for Navy shop buildings at Alameda and Mare Island, Cal., will require a total of 7500 tons (bids due Dec. 21) and that new bids have been called for Dec. 20 on 5200 tons of shapes for portions of the Lake Washington pontoon bridge at Seattle. At ST. LOUIS an award of 550 tons for a Granite City Steel Co. plant was reported.

New projects include 6000 tons for an Ohio River bridge at Owensboro, Ky.; 3000 tons for a Kings Park, N. Y., infirmary, and 2000 tons for the Nassau County court house at Garden City, N. Y.

Market Sidelights

The Navy Department's Bureau of Supplies and Accounts has awarded a $105,000 contract to the Central Iron & Steel Co., of Harrisburg, Pa., for 2000 tons of plates.

* * *

The Navy also has awarded contracts valued at $24,050 for approximately 294 tons of steel shapes to these companies: Ross Galvanizing Works, Inc., an $1,800 contract; Jones & Laughlin Steel Corp., $1,350; Bethlehem Steel Co., Bethlehem, Pa., $900; Thomas Gregory Galvanizing Works, Maspeth, N. Y., $13,900; and Carnegie-Illinois Steel Corp., Washington, $6,100.

* * *

The War Department has awarded a $2,346,128 contract to North American Aviation, Inc., of Inglewood, Cal., for 74 observation planes and spare parts. To be powered with a Wright cyclone engine developing 850 hp., the planes will all be of the O-47B type.

* * *

Fair weather on the Great Lakes enabled vessel shipments of finished steel to hold up strong until Dec. 12, when most ships were laid up due to the expiration of insurance contracts. Most of the steel was routed to Detroit from Buffalo, Conneaut, Cleveland and South Chicago. Other shipments recently included pig iron, scrap, coke and pipe.

* * *

Output of iron and steel next year may be expected to advance from the 1938 level between 30 and 50 per cent, said Col. Leonard P. Ayres, vice-president, Cleveland Trust Co., Cleveland, making his annual business predictions at Cleveland Dec. 13. Production is likely to be greater than that of 1935 but not as large as the outputs of 1936 and 1937, he added. The forecaster predicted automobile output in 1939 also should be 30 to 50 per cent higher than in 1938 while contracts for new construction will probably be larger than those of any previous recovery year.

PLATES

. . . Railroad car programs aiding a dull market

RAILROAD car repair programs have given the dull plate market some impetus. The Wheeling & Lake Erie award of 400 hoppers to Ralston Steel Car Co., Columbus, Ohio, will require about 6000 tons, mostly plates, and the railroad will specify the distribution to mills. The Chesapeake & Ohio program of 6400 tons for its Russell, Ky., shops is mostly plates, shapes, axles and wheels.

Producers in the ST. LOUIS area also report that there has been fair activity as the result of railroad car building programs.

The plate market in the EAST area continues to dwindle to a mere trickle of orders. The only new business in sight are caissons for four channel bridges at Cape May, N. J., on which bids will be opened on Thursday. The tonnage involved in the caissons, exclusive of the bridge structure, is around 500 tons. Aside from this project, prospects for plate sales before the first of the year are small.

RAILROAD BUYING

. . . Rail and car buying programs aiding the steel market

THE railroads, whose purchases this year have been meager, are aiding the steel markets at a time when other new business has lapsed into year-end dullness. There has been some activity in both rolling stock and track material.

Rails are relatively the more important item in tonnage placed on mill books. The Chesapeake & Ohio has divided orders for 25,000 tons of 131-lb. rails among the Carnegie-Illinois Steel Corp., the Bethlehem Steel Co. and the Inland Steel Co., while its affiliated road, the Pere Marquette, has ordered 3250 tons of 122-lb. rails from the same three companies. The Norfolk & Western has bought 13,000 tons of rails, of which 9750 tons will be furnished by Carnegie-Illinois and 3250 tons by Bethlehem. The Union Pacific will buy from 80,000 to 100,000 tons of rails, W. M. Jeffers, president, announces.

A foreign order for rails is 3000 tons for the Central Railway of Brazil, placed with the Carnegie-Illinois mill, making 7000 tons for Brazil that has been ordered within the past few weeks.

The Wheeling & Lake Erie has awarded 400 hopper cars to the Ralston Steel Car Co., Columbus, Ohio. These will require about 6000 tons of steel. The Chesapeake & Ohio has awarded 6400 tons of fabricated steel car parts for use at its Russell, Ky., shops.

The Reading-Central of New Jersey has ordered 15 diesel-electric switching locomotives as follows: nine from Electro-Motive Corp., four from American Locomotive Co., one from Baldwin Locomotive Works, and one from Fairbanks, Morse & Co. The Illinois Central has approved expenditures for converting 13 of the 2-10-2 type locomotives into the 4-8-4 type at its Paducah, Ky., shops. The Union Pacific has ordered one diesel-electric locomotive from the Electro-Motive Corp.

Two railroads with headquarters at St. Louis have asked the Federal Court there to approve expenditures for improvements during 1939. The 1939 budget of the St. Louis-San Francisco railway totals $2,306,421, with salvage and other retirement values amounting to $906,741, reducing the net cost to $1,078,914, and includes the following: 70 miles new 112-lb. rails—10 miles between Rosati and St. James, Mo.; 13.4 miles between Beggs and Okmulgee, Okla.; 39.9 miles between Blue Springs and Amory, Miss., and five miles near Miller, Miss.; tie plates for new rails, $54,940; tie plates for use elsewhere, $300,000; total for new rails and accessories, $1,251,311; build five new mountain type freight locomotives with 70-in. drivers in shops at Springfield, Mo., $192,370; convert five locomotives, $105,672; equip 25 locomotives with brakeman's cab, $5,025; equip 50 locomotives with power reverse gears, $7,203; equip 75 locomotives with foam meters, $22,343; equip 25 locomotives with thermic syphons, $48,727; equip 50 locomotives with Gunderson anti-pitting devices, $2,406; equip 14 locomotives with 1500-class mechanical lubricators, $3,314; equip 5000 freight cars with bolster friction truck springs, $120,800; automatic block signals, $140,735, including Sulphur to Henryetta, $121,785, and bridges and trestles, $714,026.

The St. Louis Southwestern Railway has asked authority to spend $1,668,356, of which $673,131 is for improvements authorized in 1938, but not carried out, the budget including 50 miles of 112-lb. rails from Pine Bluff to Best, Ark., $570,214; 257,968 tie plates and 60,000 rail anchors, $70,801; build 60 steel coal-ballast general service cars, 100,000-lb. capacity, $180,000; build six Trust series box or auto cars, $13,200; increase height of 500 box cars while being rebuilt, $65,000; convert 30 box cars to boarding cars, $12,654. The application has been set for hearing before Judge Davis for Dec. 21.

The Southern Railway has been granted authority to sell $6,000,000 in equipment trust certificates to the RFC to acquire 2464 all-steel freight cars and 25 all-steel express cars, which will require about 25,000 tons of steel. The cars have been distributed as follows: Pullman Standard Car Mfg. Co., Bessemer, Ala., 1332 40-ton box cars; Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., 1032 50-ton high-side gondola cars; the Ralston Steel Car Co., Columbus, Ohio, 100 40-ton steel frame stock cars; Bethlehem Steel Co., 25 30-ton all-steel baggage cars.

TIN PLATE

. . . Increased production expected after turn of year

A GRADUALLY ascending scale of tin plate production, now at about 35 per cent, is indicated for the first quarter. Mills have received a fair volume of business for January shipment. The inventory situation is much different than it was a year ago, when there were heavy stocks. Now the stocks in the hands of can makers are below normal, while mill stocks have been reduced by the release of shipments since the new price of $5 a base box became effective on Nov. 10.

BOLTS, NUTS, RIVETS

. . . Concessions from present published prices are withdrawn

PRODUCERS are eliminating all concessions from present published prices and from now on will quote firmly at the full printed price levels. Published prices on cap and set screws have been advanced.

Incoming business for bolt, nut and rivet manufacturers continues spotty as expected at this season. Part of the void created by waning automotive specifications has been filled by farm equipment manufacturers who are completing schedules for the first half of 1939. In some areas jobbers are reported buying a little better, but this is not a general condition, as it is quite evident that the year-end inventory problem is a detriment in many parts of the country.

MERCHANT BARS

. . . Orders lagging . . . Automotive requirements foremost

TOTAL bar bookings at PITTSBURGH have slipped off some in the past week, but support is expected when automobile companies resume buying. Individual orders continue small with practically all consumers holding requirements down until the year-end.

New business at CLEVELAND and YOUNGSTOWN remains consistent but lighter from the standpoint of individual orders. Most shipments are finding their way to the automotive industry.

Forgers in the CHICAGO district are fairly busy with automotive and industrial tractor production. Farm equipment makers' activity is still lagging, their orders being occasional and not large.

SHEETS AND STRIP

. . . Automotive buying the principal hope for January tonnage

MAKERS of sheets and strip look forward to renewed buying by the automobile companies to give them sufficient tonnage to make a good showing in January. There has been some automotive buying at Detroit, one company having placed orders for about 20,000 tons, but more purchases are expected either late this month or early in January. It is understood that there was no pressure for price concessions on the tonnages recently placed in Detroit.

Many of the mills, particularly the cold rolling auxiliaries of continuous mills, have a fairly substantial tonnage to get out this month against the low-priced commitments taken in October. As a matter of fact, some mills probably will not be able to complete their cold rolled sheet commitments by Dec. 31. Moreover, some buyers who have not specified their October commitments in full probably will send specifications to the mills late this month so that shipments will not be received until after Jan. 1. Whether such late specifications will be accepted by the mills remains to be seen. If they are accepted, sheet and

strip rollings may hold up at a fairly good rate during the early part of January at least, and if these are supplemented by automotive buying and an upward trend in tin plate production, the continuous mills may do fairly well next month despite the large inventories which many consumers will have on hand.

One of the difficulties in completing shipments of cold rolled sheets is that some mills are limited in their cold rolling and annealing facilities as compared with their hot rolled capacities.

WIRE PRODUCTS

. . . Concessions on merchant items withdrawn

A RAGGED price situation in merchant wire products, which has existed for some time, particularly in the secondary market in the EAST, shows signs of being cleared up. Some mills had contributed to the situation by selling nails to jobbers at as low as $2 a keg, base, against a published price to jobbers of $2.25, the result having been that jobbers were persistently underselling the mill price of $2.45 a keg to consumers. Some large consumers such as the roofing companies were also able to buy at around $2 or less.

Mills have withdrawn all concessions and have reestablished the published price of $2.25 to jobbers and $2.45 to consumers. In some instances buyers have been given until Dec. 31 to send in specifications against low-priced commitments.

REINFORCING BARS

. . . Increase in awards expected for remainder of 1938

NEARING of the PWA Jan. 1 deadline has caused a very sharp increase in inquiries, and awards are somewhat heavier. In the EAST 800 tons for a Federal prison at Danbury, Conn., will be provided by Truscon Steel Co. Awards in New York City and vicinity have declined with the largest new work out for bidding 1000 tons of bar mats and mesh for New Jersey highways.

Specifications have gained at PITTSBURGH, and at CHICAGO, with 3800 tons for the subway likely to be awarded within a week, the list of awards and inquiries is longer than at any other time this year. The Willert Park housing project at BUFFALO will require about 300 tons.

On the WEST COAST, Columbia Steel Co. took 1354 tons for the Central Valley project while bids on 9500 tons of bars for the Lake Washington pontoon bridge have been rejected and readvertised for Dec. 20. Plans for early 1939 indicate that reinforced concrete structures will compose a large part of the Navy's building program, which will include barracks, dormitories and warehouses.

TUBULAR GOODS

. . . Mechanical goods moving fairly well . . . Other pipe demand slack

FASTEST moving product is mechanical tubing, a fair portion of which goes to the auto trade. Further slackening is noted in oil-country goods sales at PITTSBURGH, while little or no change is registered in standard pipe demand.

At CLEVELAND and YOUNGSTOWN the month has started off in dull fashion due to the inventory problem in many states and depleted oil company budgets.

A pipe line from Wichita Falls to Houston, Tex., a distance of about 250 miles, of 8-in. pipe, involving approximately 15,000 tons of steel, is being talked about. Hope Engineering Co., New York, is reported to have stated the project will start within the next four months.

COLD FINISHED BARS

. . . Demand is fair . . . Improvement expected after Jan. 1

IN general, demand has picked up some in the past few weeks. While automotive tonnages are fair, demand has also come from household appliance makers. Jobber requirements on the other hand are not large, due to approaching inventory-taking periods. Consumers' stocks are such that a marked improvement in general business conditions would catch some customers shorthanded.

. . . PIPE LINES . . .

Metropolitan District Water Supply Commission, 20 Somerset Street, Boston, R. Nelson Molt, secretary, asks bids until Dec. 19 for approximately 10,000 ft. of precast steel-cylinder reinforced-concrete pressure pipe, 12 ft. 6 in. diameter; about 66,000 ft. of similar pipe, 11 ft. 6 in. diameter; and 2200 ft., 7 ft. diameter, for aqueduct pressure line for water supply at Southborough, Framingham, Wayland, Natick and Weston, Mass. Frank E. Winsor, 35 Main Street, Natick, Mass., is chief engineer for commission (Contract 85). (Estimated cost of materials to be furnished and delivered under this contract is $4,600,000.)

Kentucky Natural Gas Corp., Owensboro, Ky., plans extensions in pipe lines for natural gas transmission facilities in connection with contracts now being made for furnishing supply to Indiana Gas Utilities Co., Terre Haute, Ind., for distribution in that city, as well as West Terre Haute, Brazil and Clinton, Ind., now being served with mixed gas; and with Public Service Co. of Indiana, Indianapolis, for distribution at Bloomington, Martinsville, Bedford, Franklin, Columbus, Mitchell, Seymour and Greencastle, Ind., now similarly being furnished with mixed natural and artificial gas. Two last noted utilities also will make improvements and extensions in pipe line distributing systems, operating and control facilities in different districts noted.

Carnegie Natural Gas Co., Frick Building, Pittsburgh, has let contract to Rich & Co., Inc., Bradford, Pa., for new 8-in. welded steel pipe line from gas fields in Fayette County, near Uniontown, Pa., to Clairton, Pa., about 27 miles, for natural gas transmission, connecting with main pipe line of company at last noted place, leading to Pittsburgh, for increased supply in industrial area of that city. Cost close to $500,000 with control stations and other operating facilities.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Dec. 13, 1938	Dec. 6, 1938	Nov. 16, 1938	Dec. 14, 1937	1938	1937
Fabricated structural steel awards	13,250	40,710	17,700	25,250	872,920	836,635
Fabricated plate awards	610	9,225	1,545	2,765	128,850	130,455
Steel sheet piling awards	2,025	2,070	400	100	48,985	59,130
Reinforcing bar awards	8,000	11,150	4,750	2,550	322,150	266,680
Total Letting of Construction Steel..	23,885	63,155	24,395	30,665	1,372,905	1,292,900

FABRICATED STEEL

. . . Lettings decline to 13,250 tons from 40,710 tons last week . . . New projects lower at 23,550 tons . . . Plate awards only 610 tons.

NORTH ATLANTIC STATES
AWARDS

1500 Tons, New York, reconstruction roadway, Williamsburg Bridge, to American Bridge Co., Pittsburgh.

820 Tons, New York, Washington Heights apartment building, to Dreier Structural Steel Co., New York.

535 Tons, New York, alterations to hangar No. 3, North Beach Airport, to American Bridge Co., Pittsburgh.

415 Tons, Auburn, N. Y., Technical Junior-Senior High School, to Syracuse Engineering Co., Syracuse, N. Y.

310 Tons, Washington, Government garage, to American Bridge Co., Pittsburgh; Harwood Nebel Co., contractor.

180 Tons, College Park, Md., engineering building and dining hall, to Barber & Ross, Inc., Washington; through James Stewart & Co., contractor.

150 Tons, Reading, Pa., Textile Machine Works wood-working building, to Reading Steel Products Co., Reading.

135 Tons, Middletown, Conn., infirmary and paint shop, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

100 Tons, New York, Religious Center at World's Fair, to Belmont Iron Works, Philadelphia.

SOUTH AND SOUTHWEST

837 Tons, Roswell, N. M., Pecos River bridge, to American Bridge Co., Pittsburgh.

210 Tons, Ashland, Ky., Federal jail buildings, to Ingalls Iron Works Co., Birmingham.

210 Tons, Dallas, Tex., Junior High School, to Austin Brothers, Dallas; through Nathan Wohlfeld, contractor.

100 Tons, Williamson County, Tex., bridge, to Austin Brothers, Dallas, Tex.

100 Tons, Oklahoma County, Okla., bridge, to J. B. Klein Iron & Foundry Co., Oklahoma City.

CENTRAL STATES

1740 Tons, Rantoul, Ill., Air Corps technical school, Chanute Field, to American Bridge Co., Pittsburgh; through J. L. Simmons.

650 Tons, Lawrenceburg, Ind., bridge, to Midland Structural Steel Co., Cicero, Ill.

600 Tons, Hutsonville, Ill., bridge, to Wisconsin Bridge & Iron Co., Milwaukee.

555 Tons, Oshkosh, Wis., bridge, to Worden-Allen Co., Milwaukee.

550 Tons, Granite City, Ill., additions for Granite City Steel Co., to Stupp Brothers Bridge & Iron Co., St. Louis.

535 Tons, Polk, Iowa, bridge, to Des Moines Steel Co., Des Moines, Iowa; through Alexander, Repass Co.

400 Tons, Terre Haute, Ind., Union Building, to International Steel Co., Evansville, Ind.; through R. E. Meyer.

200 Tons, Bayfield, Wis., bridge, to Wausau Iron Works, Wausau, Wis.; through J. E. Hinman.

175 Tons, Whiting, Ind., main tower platforms, Standard Oil Co. of Indiana, to American Bridge Co., Pittsburgh.

165 Tons, Radford, Mich., addition, Diesel Engine Division, General Motors Corp., to Bethlehem Steel Co., Bethlehem, Pa.

140 Tons, Benton Harbor, Mich., Willow Street bridge, to Kalamazoo Foundry & Machine Co., Kalamazoo, Mich.; through Yearington & Gettman Brothers.

125 Tons, Cincinnati, addition to gym building, Procter & Gamble Co., to Bethlehem Steel Co., Bethlehem, Pa.

120 Tons, Detroit, administration building, sewage treatment plant, to Ingalls Iron Works, Birmingham.

115 Tons, Cleveland, municipal power plant trestle, to Kilroy Structural Steel Co., Cleveland.

110 Tons, Kane County, Ill., bridge, to Lakeside Bridge & Iron Co., Milwaukee.

WESTERN STATES

1100 Tons, Grand Coulee Dam, Wash., drum gate anchorages to John W. Beam, Denver; gate seats to Stearns Rogers Mfg. Co., Denver; anchor bolts to Kilby Steel Co., Anniston, Ala. (Specification 805).

362 Tons, Woodland, Wash., Lewis River bridge, to Northwestern Equipment Co., Portland, Ore.; through L. H. Hoffman, Portland, contractor.

PENDING STRUCTURAL PROJECTS
NORTH ATLANTIC STATES

16,500 Tons, New York, Criminal Courts building, Bethlehem Steel Co., Bethlehem, Pa., low on steel contract (tonnage previously noted).

3000 Tons, Kings Park, N. Y., infirmary building.

2000 Tons, Garden City, N. Y., Nassau County court house.

700 Tons, Stapleton, N. Y., Marine Hospital building extension.

600 Tons, Mystic, Conn., State administration school and dormitory buildings.

600 Tons, Dannemora, N. Y., hospital building, Clinton Prison.

600 Tons, bridge, Elmira, N. Y.; bids Dec. 19 (tonnage previously reported).

500 Tons, Long Beach, N. Y., school building.

350 Tons, Brooklyn, public school No. 142; Caristo Construction Co., Brooklyn, low on general contract (tonnage previously reported).

300 Tons, Southborough, Mass., tunnel.

300 Tons, Trenton, N. J., addition to court house; bids due Dec. 20.

265 Tons, Norwich, Conn., Shetucket River bridge.

235 Tons, New York, Corona Health Center.

235 Tons, Quoque, N. Y., bascule bridge.

200 Tons, Southbury, Conn., State highway bridge PWA-1308-5-F.

200 Tons, Long Island City, N. Y., warehouse, Mohegan Steel Co.

200 Tons, Philadelphia, overpass.

185 Tons, Tioga, N. Y., grade and high school.

150 Tons, Pittsburgh, Liberty tubes traffic elimination.

125 Tons, New York, reconstruction of T bridge.

120 Tons, Main, N. Y., grade and high school.

115 Tons, Belmont, Mass., addition to high school.

100 Tons, Huntington, Vt., State bridge.

100 Tons, Bangor, Me., police station and municipal garage, C. E. Burton Co., Portland, Me., contractor.

100 Tons, Ashland, Del., highway bridge; bids due Dec. 20.

THE SOUTH

6000 Tons, Owensboro, Ky., Ohio River bridge, Owensboro Bridge Commission.

900 Tons, Charleston, W. Va., Elk River bridge.

776 Tons, Ponca City, Okla., bridge.

CENTRAL STATES

1000 Tons, Saginaw, Mich., high school.

962 Tons, State of Wisconsin, four bridges; bids Dec. 20.

925 Tons, Sparta, Wis., bridge.

700 Tons, Ecorse, Mich., Wayne County bridges.

600 Tons, Kent, Ohio, McGilvrey Hall, Kent University.

235 Tons, Youngstown, stockhouse runway, Republic Steel Corp.

240 Tons, Cleveland, Garfield Heights high school; Paugh & Brown, Cleveland, general contractor (tonnage previously noted).

200 Tons, Youngstown, Ohio, Isaly Dairy Co. expansion; bids Dec. 16.

200 Tons, Pike County, Ohio, State bridge; will be re-bid (previously noted).

183 Tons, Akron, Ohio, East Market Street grade elimination; bids received Dec. 14.

100 Tons, Cleveland, Veterans' Hospital; bids Dec. 27.

100 Tons, Mansfield, Ohio, South Junior High School; Steinle-Wolfe Construction Co., Fremont, Ohio, low bidder.

100 Tons, Van Wert County, Ohio, State bridge; bids Dec. 27.

WESTERN STATES

5000 Tons, Mare Island, Cal., Navy shop building; bids Dec. 21, postponed from Dec. 14 (previously reported).

3000 Tons, Alameda, Cal., navy shop building, revised tonnage; bids Dec. 21 (previously reported).

280 Tons, Oakland, Cal., Port of Oakland hangar (subject to PWA approval).

240 Tons, Grand Junction, Colo., overpass; bids Dec. 19.

FABRICATED PLATES
AWARDS

355 Tons, Pittsburgh, Lincoln water storage tank, to Hunter Steel Co., Pittsburgh.

155 Tons, Ashland, Ky., two tanks, to Ingalls Iron Works Co., Birmingham

100 Tons, Brunswick, Me., water tank, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

NEW PROJECTS

2000 Tons, Corbett, Wyo., Shoshone River and Buck Springs Creek siphons.

100 Tons, Montpelier, Vt., two 500,000-gal. tanks.

100 Tons, Lawrence, Mass., water tanks.

SHEET PILING
AWARDS

1500 Tons, Long Beach, Cal., H-piling for Ford Motor Co. plant, to Carnegie-Illinois Steel Corp., San Francisco.

275 Tons, San Francisco, Atchison, Topeka & Santa Fe warehouse H-piles, to Bethlehem Steel Co., San Francisco.

250 Tons, Cleveland, Standard Oil of Ohio, river improvement, to Carnegie-Illinois Steel Corp., Pittsburgh.

NEW PROJECTS

200 Tons, Cleveland, Sherwin-Williams Co., river dock improvement.

. . . NON-FERROUS . . .

. . . Zinc and lead sales in better volume; copper dull . . . Lead prices lowered $2 a ton.

ALTHOUGH there are signs of a revival of consumer interest in non-ferrous metals, so far this movement has not assumed important dimensions. The desire to keep inventory stocks as low as possible and the unsettled condition of the market over the past several weeks are the chief factors retarding the development of this trend. Copper sales in the past week were very light, averaging about 700 tons a day, with inter-company transactions accounting for most of this total. The foreign price situation is unimproved. The c.i.f. equivalent continues to hover in the neighborhood of 10.25c. per lb., while the domestic producers' quotation is unchanged, up to Tuesday, at 11.25c. per lb., Connecticut Valley. The market did not receive much support from the November statistics which revealed a 2189-ton increase in stocks and a 18,048-ton drop in deliveries. The shipment total for the month was 64,557 tons and total reserves at the end of the period were 269,488 tons. The foreign picture was more encouraging, as it showed only a 3900-ton drop in shipments and a decrease in stocks to 155,049 tons.

Tin

Little business was transacted in the domestic market in the past week and prices fluctuated aimlessly in a narrow range centering at 46c. per lb., New York. Chief interest during the week was in a 100-ton purchase by the Navy Department and a 100-ton inquiry for December-January delivery from an automobile producer.

Lead

In an effort to attract to buyers, a leading custom smelter reduced prices $2 a ton on Friday and was immediately followed by all other selling interests. The new price basis is 4.60c. per lb., St. Louis. The price reduction stirred up a fairly substantial volume of buying, in many cases equaling the seller's intake. The new demand is well diversified as to consuming industries, and is mostly for December delivery. The week' activity brought the December coverage up to about 75 per cent and January to 15 per cent.

Zinc

Sales in the past week took an unexpected jump to 3280 tons from 1708 tons in the previous week. Shipments, at 3268 tons, were close to the sales total. The bulk of the week's sales carried first quarter delivery dates, as current needs are fairly well covered. In view of the low level of sales in the three previous weeks, it would not be surprising to see an active market again, if consumers can be convinced that the current price of 4.50c. per lb., East St. Louis, actually represents the nadir of the present price movement. Market opinion is that a revision of import duties is highly unlikely, despite the protests of the spelter trade.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Dec. 7	Dec. 8	Dec. 9	Dec. 10	Dec. 12	Dec. 13
Electro, copper[1]	11.25	11.25	11.25	11.25	11.25	11.25
Lake copper	11.375	11.375	11.375	11.375	11.375	11.375
Straits, tin, New York	46.45	46.10	45.85	...	46.00	46.00
Zinc, East St. Louis[2]	4.50	4.50	4.50	4.50	4.50	4.50
Lead, St. Louis [3]	4.70	4.70	4.60	4.60	4.60	4.60

[1] Delivered Conn. Valley, deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Base per lb., Delivered

	New York	Cleveland
Tin, Straits pig	47.00c.	49.75c.
Copper, lake	12.25c.	12.375c.
Copper, electro	11.50c.	12.375c.
Copper, castings	11.25c.	11.875c.
*Copper sheets, hot-rolled	19.375c.	19.375c.
*High brass sheets	17.50c.	17.50c.
*Seamless brass tubes	20.25c.	20.25c.
*Seamless copper tubes	19.875c.	19.875c.
*Brass rods	13.375c.	13.375c.
Zinc slabs	6.25c.	7.25c.
Zinc sheets, No. 9 casks	10.50c.	12.10c.
Lead, American pig	5.50c.	5.50c.
Lead, bar	6.275c.	8.50c.
Lead, sheets, cut	8.00c.	8.00c.
Antimony, Asiatic	15.00c.	17.75c.
Alum., virgin, 99 per cent plus	22.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.50c.	19.50c.
Solder, ½ and ½	28.50c.	29.10c.
Babbitt metal, commercial grade	22.75c.	22.50c.

*** These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.**

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.00c.	8.75c.
Copper, hvy. and wire	7.00c.	7.50c.
Copper, light and bottoms	6.25c.	6.50c.
Brass, heavy	4.25c.	4.75c.
Brass, light	3.375c.	4.125c.
Hvy. machine composition	6.125c.	7.625c.
No. 1 yel. brass turnings	4.125c.	4.625c.
No. 1 red brass or compos. turnings	5.875c.	6.50c.
Lead, heavy	3.625c.	4.50c.
Cast aluminum	7.00c.	8.25c.
Sheet aluminum	11.75c.	13.25c.
Zinc	2.25c.	3.50c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt, No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York; Asiatic, 14c. a lb., f.o.b.; American, 11.25c. a lb. QUICKSILVER, $77 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11c. a lb. lcl.

Merge 3 Railroads Under U. S. Steel Management

THE Interstate Commerce Commission has approved a merger of the Elgin, Joliet & Eastern, the Chicago, Lake Shore & Eastern and the Joliet & Blue Island railroads. They will be operated under the management and name of the Elgin, Joliet & Eastern, subsidiary of the United States Steel Corp.

IRON AND STEEL SCRAP

. . . Most markets quiet, but mill sale in Philadelphia market has boosted the price on No. 1 steel 50c., raising the composite 17c. to $14.92.

DEC. 13.—Sale of a moderate tonnage of No. 1 steel to an eastern Pennsylvania mill has resulted in a quoted increase of 50c. in that grade. No. 2 is also stronger in the Philadelphia market due to export activity, with a spread of only 50c. between the two grades at Port Richmond. Prices are unchanged at both Pittsburgh and Chicago, although the market appears slightly softer at the former point. As a result of the increase in No. 1 steel at Philadelphia, the composite is raised 17c. to $14.92, the average that prevailed two weeks ago.

Scrap shipments are being closely regulated at several points, but in the main most quotations are unchanged from last week. Dealer bids at Cincinnati are lower and No. 1 steel at Detroit is softer. Largest sale reported is 4000 tons of heavy melting steel at St. Louis at previously quoted levels, although No. 2 steel is softer there.

Pittsburgh

The market appears slightly softer in tone but quotations are unchanged this week on No. 1 steel. Small amounts of this grade have been picked up in the immediate Pittsburgh district at $15 a ton but some brokers are still paying $15.25 to cover on a recent moderate sized $15.50 order. Meanwhile, sales into consumption at other points in the district have been made in the past week at $16 a ton or better.

Chicago

The market is firm at $14 top for heavy melting but quiet. Mills do not appear interested at the moment and broker-dealer trading is moderate, since long and short positions are fairly well equalized.

Youngstown

With shipments shut off at Warren and other points and strictly regulated at one other plant as the year-end approaches, the market is quet here but published quotations have held up. Offers from the down river district are strong.

Cleveland

Dealers have found scrap a little easier to buy recently, but printed quotations are unaffected. Partially counterbalancing the decline in ingot production and the caution against large year-end inventories, is the fact that scrap production of manufacturing plants has lessened.

Buffalo

As a result of a complete hold-up of shipments at one mill and regulated acceptances at the others, scrap sales are practically at a standstill for the time-being. The market hinted at a tendency to softness for a short time but appears to have regained all of its former strength. Cast materials continue to move out in small lots.

St. Louis

The scrap iron market is steady, following the purchase of 4000 tons of heavy melting steel at present levels by an East Side mill, and the tightening of offerings. The tonnage bought was divided among four dealers and is for delivery in January. No. 2 heavy melting, miscellaneous standard section rails and Nos. 1 and 2 wrought are 25c. a ton down. Heavy turnings advanced 50c. Railroad lists: Louisville & Nashville, 9000 tons; Southern, 3434 tons; Chicago, Rock Island & Pacific, 500 tons; Missouri Pacific, 869 tons, Standard Oil Co. offers 115 tons at Woodriver, Ill.

Cincinnati

Old materials have developed marked softness. Mills tend to back away from the market to prevent accumulations of too heavy inventories. Bids are down 50c. on all items, but still nominal.

Detroit

Minor weakness, seemingly a reflection from other markets, has put in an appearance in the Detroit area. Decreases of 25c. a ton in No. 1 heavy melting steel (industrial grade) and sheet clippings represents, in the first case, a lower price being paid for the principal consumer since the first of this week and, in the second item, an easing of a competitive situation among dealers. Demand for scrap is still at a high level with the country side supplying truckloads to Detroit's principal consumer at a reported premium in price, primarily to prevent the scrap from going out of town.

New York

The local market is very quiet, despite the fact that substantial tonnages are going forward on European and Oriental orders. Buying prices are unchanged, both at barges and on cars for shipment into eastern Pennsylvania.

Boston

The export market for Nos. 1 and 2 steel and rails is fully 25c. a ton higher, with top prices being paid more often than outside. While $13.75 a ton on dock is the current top price, exporters intimate they would pay 25c. a ton more for selected stock. Shippers are optimistic regarding the future, some of them having enough business booked for Japan delivery to keep them well occupied the next two months. However, the New England Shippers Advisory Board predicts that New England scrap carloadings during the first quarter of 1939 will be 30 per cent smaller than in the like period this year. Some busheling, turnings and No. 1 machinery cast sales are reported for domestic consumption, but business in this section of the scrap market is a long way from active.

Philadelphia

A small lot of No. 1 steel has been sold into domestic consumption at $15.50, delivered, and the price list has been revised to conform with this change. Only the heavy melting steel grades are active, and they are deriving most of their strength from continued buying for export. Offers of $13.50 and $14.50 for No. 2 and No. 1, respectively, are freely made for delivery to Port Richmond, and enough material has been and will be collected this month to take care of about five boats. That this movement will continue for some time is quite likely in view of the fact that additional export business is in the process of negotiation, with prices in general progressively improving. Domestic shipments on old orders continue to be rather spotty, and the delivery situation has been helped by Lukens releasing shipments on most items on a very limited schedule.

November Building Activity a Record

CONSTRUCTION contracts awarded in 37 Eastern states amounted to $301,679,000, the highest November total since 1929, according to the F. W. Dodge Corp. This total represents a gain of 52 per cent over the November, 1937, figure.

Both public and private work contributed to the month's gain, with public work still accounting for the bulk of the total. The volume of private work contracted for in November rose to $122,731,000, while public contracts were valued at $178,948,000. The total of all contracts for the first 11 months of the current year is $2,807,489,000, as compared with $2,703,609,000 in the corresponding period of 1937.

Rail Equipment Needs Set at $1,000,000,000

DECLARING that the railroads in the next five years could profitably expend one billion dollars annually for new freight cars and locomotives, repair of existing equipment and improvement in track and facilities, R. V. Fletcher, general counsel of the Association of American Railroads, on Dec. 12 discussed before the Senate Finance Committee the advisability of amending the tax laws so as to permit such expenditures being taken into consideration in computing taxes to be paid by the railroads.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.50 to $16.00
Railroad hvy. mltng..	16.00 to 16.50
No. 2 hvy. mltng. steel.	14.25 to 14.75
Scrap rails	16.50 to 17.00
Rails 3 ft. and under..	17.00 to 17.50
Comp. sheet steel	15.50 to 16.00
Hand bundled sheets..	14.50 to 15.00
Hvy. steel axle turn..	14.00 to 14.50
Machine shop turn....	9.75 to 10.25
Short shov. turn.....	10.50 to 11.00
Mixed bor. & turn....	8.25 to 8.75
Cast iron borings.....	8.25 to 8.75
Cast iron carwheels...	15.00 to 15.50
Hvy. breakable cast...	12.50 to 13.00
No. 1 cupola cast.....	15.25 to 15.75
RR. knuckles & cplrs.	16.50 to 17.00
Rail coil & leaf springs	16.50 to 17.00
Rolled steel wheels...	16.50 to 17.00
Low phos. billet crops.	17.50 to 18.00
Low phos. punchings..	16.50 to 17.00
Low phos. plate	16.50 to 17.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.50 to $15.00
No. 2 hvy. mltng. steel.	13.50
Hydraulic bund., new.	14.50 to 15.00
Hydraulic bund., old..	11.50 to 12.00
Steel rails for rolling.	17.00 to 17.50
Cast iron carwheels...	16.50 to 17.00
Hvy. breakable cast...	16.00
No. 1 cast.	16.50 to 17.00
Stove plate (steel wks.)	13.00 to 13.50
Railroad malleable	15.50 to 16.00
Machine shop turn....	8.50 to 9.00
No. 1 blast furnace....	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings..	10.00 to 10.50
No. 1 low phos. hvy...	16.50 to 17.00
Couplers & knuckles..	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Steel axles	21.50 to 22.00
Shafting	20.00 to 20.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	11.00 to 11.50
Cast borings (chem.)..	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$13.50 to $14.00
Auto. hvy. mltng. steel alloy free	12.00 to 12.50
No. 2 auto. steel	10.75 to 11.25
Shoveling steel	13.50 to 14.00
Factory bundles	12.50 to 13.00
Dealers' bundles	11.50 to 12.00
Drop forge flashings..	11.50 to 12.00
No. 1 busheling	12.00 to 12.50
No. 2 busheling, old..	6.25 to 6.75
Rolled carwheels	15.25 to 15.75
Railroad tires, cut....	16.25 to 16.75
Railroad leaf springs..	15.75 to 16.25
Steel coup. & knuckles	15.25 to 15.75
Axle turnings	12.75 to 13.25
Coil springs	16.75 to 17.25
Axle turn. (elec.)	13.75 to 14.25
Low phos. punchings..	16.25 to 16.75
Low phos. plates 12 in. and under	15.75 to 16.25
Cast iron borings	5.25 to 5.75
Short shov. turn.	7.00 to 7.50
Machine shop turn....	7.00 to 7.50
Rerolling rails	17.25 to 17.75
Steel rails under 3 ft..	15.75 to 16.25
Steel rails under 2 ft..	16.25 to 16.75
Angle bars, steel	15.25 to 15.75
Cast iron carwheels...	12.25 to 12.75
Railroad malleable	14.75 to 15.25
Agric. malleable	11.25 to 11.75
	Per Net Ton
Iron car axles	19.50 to 20.00
Steel car axes	19.00 to 19.50
Locomotive tires	15.25 to 15.75
Pipes and flues	9.25 to 9.75
No. 1 machinery cast.	12.25 to 12.75
Clean auto. cast.	12.25 to 12.75
No. 1 railroad cast....	11.25 to 11.75
No. 1 agric. cast.....	10.75 to 11.25
Stove plate	8.25 to 8.75
Grate bars	8.25 to 8.75
Brake shoes	9.25 to 9.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.00 to $15.50
No. 2 hvy. mltng. steel.	13.75 to 14.25
Low phos. plate	15.50 to 16.00
No. 1 busheling	13.50 to 14.00
Hydraulic bundles	14.25 to 14.75
Machine shop turn....	9.75 to 10.25

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Comp. sheet steel	13.50 to 14.00
Light bund. stampings	11.00 to 11.50
Drop forge flashings..	13.00 to 13.50
Machine shop turn....	7.00 to 7.50
Short shov. turn.....	7.50 to 8.00
No. 1 busheling	13.00 to 13.50
Steel axle turnings....	11.00 to 11.50
Low phos. billet and bloom crops	18.00 to 18.50
Cast iron borings	7.75 to 8.25
Mixed bor. & turn....	7.75 to 8.25
No. 2 busheling	7.75 to 8.25
No. 1 cast	16.50 to 17.00
Railroad grate bars ..	9.50 to 10.00
Stove plate	10.00 to 10.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	17.00 to 17.50
Railroad malleable	15.50 to 16.00
Cast iron carwheels ..	14.00 to 14.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Scrap rails	15.00 to 15.50
New hvy. b'ndled sheets	12.00 to 12.50
Old hydraul. bundles..	11.00 to 11.50
Drop forge flashings...	12.00 to 12.50
No. 1 busheling	12.00 to 12.50
Hvy. axle turnings....	10.50 to 11.00
Machine shop turn....	6.75 to 7.25
Knuckles & couplers..	16.50 to 17.00
Coil & leaf springs....	16.50 to 17.00
Rolled steel wheels....	16.00 to 16.50
Low phos. billet crops.	15.50 to 16.00
Shov. turnings	8.75 to 9.25
Mixed bor. & turn.....	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Steel car axles	16.50 to 17.00
No. 1 machinery cast..	15.50 to 16.00
No. 1 cupola cast.	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft..	18.00 to 18.50
Cast iron carwheels...	13.50 to 14.00
Railroad malleable	15.00 to 15.50
Chemical borings	9.00 to 9.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$13.00 to $13.50
No. 1 hvy. melting....	13.00 to 13.50
No. 2 hvy. melting....	11.75 to 12.25
No. 1 locomotive tires.	13.00 to 13.50
Misc. stand. sec. rails.	13.50 to 14.00
Railroad springs	15.50 to 16.00
Bundled sheets	8.00 to 8.50
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.....	4.00 to 4.50
Machine shop turn....	4.50 to 5.00
Heavy turnings	9.50 to 10.00
Rails for rolling	17.00 to 17.50
Steel car axles	19.00 to 19.50
No. 1 RR. wrought....	10.50 to 11.00
No. 2 RR. wrought....	12.75 to 13.25
Steel rails under 3 ft..	15.50 to 16.00
Steel angle bars	14.50 to 15.00
Cast iron carwheels...	14.00 to 14.50
No. 1 machinery cast..	14.50 to 15.00
Railroad malleable ...	12.00 to 12.50
No. 1 railroad cast....	12.50 to 12.75
Stove plate	9.00 to 9.50
Grate bars	8.50 to 9.00
Brake shoes	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$11.50 to $12.00
No. 2 hvy. mltng. steel.	9.25 to 9.75
Scrap rails for mltng.	15.25 to 15.75
Loose sheet clippings.	6.75 to 7.25
Hydrau. b'ndled sheets	11.00 to 11.50
Cast iron borings	4.00 to 4.50
Machine shop turn....	5.25 to 5.75
No. 1 busheling	8.00 to 8.50
No. 2 busheling	2.75 to 3.25
Rails for rolling	17.50 to 18.00
No. 1 locomotive tires.	14.25 to 14.75
Short rails	18.00 to 18.50
Cast iron carwheels...	12.75 to 13.25
No. 1 machinery cast.	13.50 to 14.00
No. 1 railroad cast....	12.75 to 13.25
Burnt cast	6.75 to 7.25
Stove plate	6.75 to 7.25
Agricul. malleable	11.75 to 12.25
Railroad malleable	14.25 to 14.75
Mixed hvy. cast.	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	$12.50 to $14.00
Scrap steel rails	14.50 to 15.00
Short shov. turnings..	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought	.... 10.00
Rails for rolling	16.00 to 16.50
No. 1 cast.	.... 14.50
Tramcar wheels	.... 14.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$10.50 to $11.00
No. 2 hvy. mltng. steel.	9.00 to 9.50
Borings and turnings.	5.75 to 6.25
Long turnings	5.50 to 6.00
Short shov. turnings..	6.50 to 7.00
No. 1 machinery cast..	12.25 to 12.75
Automotive cast	13.50 to 14.00
Hvy. breakable cast...	9.75 to 10.25
Hydraul. comp. sheets.	11.75 to 12.25
Stove plate	8.00 to 8.50
New factory bushel...	10.75 to 11.25
Sheet clippings	8.25 to 9.25
Flashings	9.00 to 9.50
Low phos. plate scrap	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$10.50 to $11.00
No. 2 hvy. mltng. steel.	9.00 to 9.50
Hvy. breakable cast...	12.00 to 12.50
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Steel car axles	20.00 to 20.50
Shafting	15.50 to 16.00
No. 1 RR. wrought....	11.00 to 11.50
No. 1 wrought long....	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings*..	4.00 to 4.50
Cast borings*	3.50 to 4.00
No. 1 blast furnace...	3.50 to 4.00
Cast borings (chem.)..	9.50 to 10.00
Unprepared yard scrap	6.00 to 6.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast†....	$13.50 to $14.00
No. 2 cast†	10.50 to 11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	Nominal
Scrap rails	Nominal
No. 2 steel	Nominal
Breakable cast	$10.15
Machine shop turn....	.... 3.38
Mixed bor. & turn.....	$2.00 to 2.25
Bun. skeleton long....	.... 8.15
Shafting	10.25 to 10.50
Cast bor. chemical....	5.50 to 5.75
Per gross ton delivered consumers' yards:	
Textile cast	$13.50 to $15.00
No. 1 machine cast....	13.50 to 15.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$12.50 to $14.00
No. 2 hvy. mltng. steel.	11.50 to 13.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$11.00	$10.00
No. 2 hvy. mltng. steel.	10.00	9.00
Mixed dealers steel....	9.00	8.00
Scrap pipe	5.50	5.00
Steel turnings	4.50	4.00
Cast borings	4.00	3.50
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	10.00	9.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel.	$11.50 to $12.00
No. 2 hvy. mltng. steel.	10.00 to 10.50
No. 2 cast	.... 11.00
Stove plate	$10.00 to 10.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.	$13.50 to $13.75
No. 2 hvy. mltng. steel.	12.50 to 12.75
Rails (scrap)	.... 13.75
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	13.50 to 14.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

(Prices are f.o.b. unless otherwise indicated)

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.25c.
Detroit, delivered	2.35c.
Duluth	2.35c.
Philadelphia delivered	2.57c.
New York	2.59c.
On cars dock Gulf ports	2.60c.
On cars dock Pacific ports	2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.10c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c. to 2.05c.
Detroit, delivered	2.00c. to 2.15c.
On cars dock Tex. Gulf ports	2.25c. to 2.40c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.75c. to 1.90c.
Detroit, delivered	1.85c. to 2.00c.
On cars dock Tex. Gulf ports	2.10c. to 2.25c.
On cars dock Pacific ports	2.35c.

Prices on reinforcing bars have been subject to concessions of $3 a ton or more from above quotations.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

	Base per Lb.
Pittsburgh, Buffalo, Cleveland, Chicago and Gary	2.70c.
Detroit	2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P't'g	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.15c.
Detroit, delivered	2.25c.
Philadelphia, delivered	2.32c.
Granite City	2.25c.
On cars dock Pacific ports	2.65c.
Wrought iron, Pittsburgh	4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.20c.
Detroit, delivered	3.30c.
Granite City	3.30c.
Philadelphia, delivered	3.52c.
On cars dock Pacific ports	3.80c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron Pittsburgh	6.10c.

Electrical Sheets

(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	4.95c.
Special Dynamo	5.65c.
Transformer	6.15c.
Transformer Special	7.15c.
Transformer Extra Special	7.65c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.95c.
F.o.b. cars dock Pacific ports	4.65c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	4.40
Pittsburgh or Gary	$4.30

Roofing Terne Plate

(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

HOT ROLLED STRIP

(*Widths up to 12 in.*)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.15c.
Detroit, delivered	2.25c.

Cooperage Stock

Pittsburgh & Chicago	2.25c.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.95c.
Chicago	3.05c.
Detroit, delivered	3.05c.
Worcester	3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	3.10c.
Detroit, delivered	3.20c.
Worcester	3.50c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.95c.	3.15c.
Carbon	.51 .75	4.30c.	4.50c.
Carbon	.76-1.00	6.15c.	6.35c.
Carbon	1.01 to 1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.45
Coated nails	2.45
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Twisted barbless wire	3.20
Woven wire fence, base column.	67
Single loop bale ties, base col...	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool..	$2.54

Note: Birmingham base same on above items, except spring wire.

Add $4 a ton for Mobile, Ala.; $5 for New Orleans; $6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are $1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	56	36	¼ & ⅜	+9	+30
¼ to ⅜	59	43½	½	24	6½
½	63½	54	¾	30	13
¾	66½	58	1 & 1¼	34	19
1 to 3	68½	60½	1½	38	21½
			2	37½	21

Lap Weld

2	61	52½	2	30½	15
2½ & 3	64	55½	2½ to 3½	31½	17½
3½ to 6	66	57½	4	33½	21
7 & 8	65	55½	4½ to 8.32	32½	20
9 & 10	64½	55	9 to 12	28½	15
11 & 12	63½	54			

Butt weld, extra strong, plain ends

⅛	54½	41½	¼ & ⅜	+10	+43
¼ to ⅜	56½	45½	½	25	9
½	61½	53½	¾	31	15
¾	65½	57½	1 to 2	38	22½
1 to 3	67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	33½	18½
2½ & 6	63	55½	2½ to 4.39		25½
3½ to 6	66½	59	4½ to 6.37½		24
7 & 8	65½	56	7 & 8	38½	24½
9 & 10	64½	55	9 to 12	32	20½
11 & 12	63½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d. 13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.79	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2½ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. or over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Pet Net Ton

*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham.	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $50 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts: ½ in. & 6 in. and smaller.	65, 5 and 5*
Larger and longer up to 1 in.	60, 10 and 5*
1⅛ in. and larger	60, 5 and 5*
Lag bolts	60, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7	65, 5 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped: ½ in. and smaller	65 and 5
9/16 in. to 1 in. inclusive.	60, 5 and 5
1⅛ in. and larger	60 and 5

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

	U.S.S.	S.A.E.
Semi-fin. hexagon nuts		
½ in. and smaller	65-5	70
9/16 to 1 in.	60-10	65
1⅛ in. and larger	60-5	60-5

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 12½
Stove bolts in bulk	85

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham $3.40

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .... 65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled square head set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ¾ in. and smaller.	68 and 10
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	65 and 10
Upset set screws, cup and oval points	73 and 10
Milled studs	57 and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base ..... 2.80c.
Delivered, Detroit ..... 2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.40c. base per lb. Delivered Detroit, 3.50c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes.	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold strip	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d. to 21s. 6d.
Steel bars, open hearth.	£11
Beams, open-hearth	£10 12s. 6d.
Channels, open-hearth	£10 17s. 6d.
Angles, open-hearth	£10 12s. 6d.
Black sheets, No. 24 gage.	£13
Galvanized sheets, No. 24 gage	£15 5s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheets ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	$22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$92.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$92.75
2.50% carbon	97.75
2% carbon	102.75
1% carbon	112.75

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally	$2.00
Ferrotungsten, lots of 500 lbs. nominally	2.05
Ferrotungsten, smaller lots, nominally	2.10
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton. $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.

*Spot prices are $5 per ton higher
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12½c.
Iron, basic or foundry, Swedish, aver. 65% iron	11c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	32c.
Man., African, Indian, 44-48%	30c.
Man., African, Indian, 49-51%	32c.
Man., Brazilian, 46 to 48½%	29c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$20.00
Tungsten, domestic, scheelite delivered	$20.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$15.00
Rhodesian, 45%	19.00
Rhodesian, 48%	23.00
Turkish, 48-49%	23.00
Turkish, 45-46%	19.00
Turkish, 40-44%	16.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	$24.00
48-49%	22.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$17.00 to $18.00
Domestic, f.o.b. Ohio River landing barges	18.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	18.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal

No. 2 or diesel, f.o.b. Bayonne	4.125c.
No. 6, f.o.b. Bayonne	2.26c.
Del'd Chicago, No. 5 Bur. Stds.	3.25c.
Del'd Chicago, No. 6 Bur. Stds.	2.75c.
Del'd Cleve'd, No. 3 distillate	5.50c.
Del'd Cleve'd, No. 4 industrial	5.25c.
Del'd Cleve'd, No. 5 industrial	3.00c.
Del'd Cleve'd, No. 6 industrial	2.75c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Foundry, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.55c.
Shapes	3.55c.
Soft steel bars and small shapes	3.60c.
**Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.95c.
Hot rolled strip	3.75c.
Hot rolled sheets	3.50c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.75c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.

** On reinforcing bars base applies to orders of less than one ton and includes switching and carting charge.

All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.83c.
Structural shapes	3.75c.
Soft steel bars, round	3.94c.
Iron bars, Swed. charcoal	7.50 to 8.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.39c.
Flats up to 12 in. wide	4.39c.
Cold-rolled strip, soft and quarter hard	3.66c.
Hot-rolled strip, soft O.H.	4.11c.
Hot-rolled sheets (10 ga.)	3.73c.
Galv. sheets (24 ga.)	4.60 to 4.85c.
Long ternes (24 ga.)	5.50 to 6.20c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.90c.
Deep drawing	5.15c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.50c.
SAE, 3100, hot-rolled	6.10c.
SAE, 6100, hot-rolled annealed	10.25c.
SAE, 2300, cold-rolled	8.69c.
SAE, 3100, cold-rolled, annealed	7.29c.
Floor plate, ⅛ in. and heavier	5.43c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	$3.25

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.60c.
Soft steel squares, hexagons, channels and Tees	3.75c.
Hot rolled strip	3.75c.
Floor plates	5.15c.
Hot rolled sheets	3.50c.
Galvanized sheets	4.50c.
Cold rolled sheets	4.45c.
Cold finished carbon bars	4.05c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.55c.
Structural shapes	3.73c.
Soft steel bars	3.50c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over)	4.05c.
Hot-rolled strip	3.65c.
Cold rolled sheets	4.70c.
Cold-finished strip	3.35c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.50c.
Floor plates, 3/16 in. and heavier	5.33c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	6.05c.
Cold rolled alloy steel (3115)	6.85c.

* For 5000 lb. or less

† 500 lb., base quantity.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.82c.
Bars, soft steel (rounds and flats)	3.87c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.02c.
Cold fin. rounds, shafting, screw stock	4.32c.
Galv. sheets (24 ga.)	4.77c.
Hot rolled sheets	3.77c.
Galv. corrugated sheets, 24 ga. and heavier*	4.82c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	5.85c.
Plates, ¼ in. and heavier	3.85c.
Bars	3.98c.
Heavy hot rolled sheets	3.86c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.76c.
Galvanized sheets	4.76c.
Cold rolled sheets	4.93c.

The following quantity differentials apply: Less than 100 lb., plus $1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

Plates	3.77c.
Floor plates	5.40c.
Struc. shapes	3.55c.
Soft steel bars	3.60c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	4.05c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl. also sizes No. 8 to 30 ga.	3.50c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.97c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$47.50
Chicago District	56.05
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah Wash. (in bulk)	22.60

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.40c.
*Structural shapes	3.40c.
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
‡Reinforc. steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.36c.
*Steel hoops	4.10c.
*Steel bands, No. 12 and 3/16 in. incl.	3.60c.
*Spring steel	4.75c.
†Hot-rolled anneal. sheets	3.40c.
†Galvanized sheets (No. 24)	4.50c.
*Diam. pat. floor plates, ¼ in.	5.00c.

These prices are for delivery in Philadelphia trucking area.

*Base prices subject to deduction on orders aggregating 4000 lb. or over

†For 25 bundles or over.

‡For one to five tons.

BIRMINGHAM

Bars and bar shapes	$3.85 base	
Structural shapes and plates	3.75 "	
Hot rolled sheets No. 10 ga.	3.80 "	
Hot rolled sheets No. 24 ga.	4.40 "	3500 lb. and over
Galvanized sheets No. 24 ga.	5.05 "	3500 lb. or more
Strip	4.05 "	
Reinforcing bars.	3.85 "	
Floor plates	5.96 "	
Cold finished bars	4.91 "	
Machine and carriage bolts	.50 & 10 off list	
Rivets (structural)	$4.60 base	

On plates, shapes, bars, hot-rolled strip heavy hot-rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.85c.	4.00c.	4.05c.
Shapes, standard	3.95c.	4.00c.	4.05c.
Soft steel bars	4.05c.	4.00c.	4.30c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.675c.	open.	2.975c.
Hot-rolled sheets (No. 10)	4.00c.	4.20c.	4.20c.
Galv. sheets (No. 24 and lighter)	5.15c.	5.05c.	5.50c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.05c.	5.50c.
Cold-finished steel Rounds	6.55c.	6.60c.	7.10c.
Squares and hexagons	7.80c.	7.85c.	7.10c.
Flats	8.30c.	8.35c.	8.10c.
Common wire nails—base per keg less carload	$3.20	$3.05	$3.00

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

MEMPHIS

	Base per Lb.
Mild steel bars	4.01c.
Shapes, bar size	4.01c.
Iron bars	4.01c.
Structural shapes	3.96c.
Plates	3.96c.
Hot-rolled sheets	3.91c.
Galvanized sheets, No. 24	5.26c.
Steel bands	4.16c.
Cold-drawn rounds	4.61c.
Cold-drawn flats, squares, hexagons	6.61c.

REINFORCING STEEL

. . . *Awards of 8000 tons—25,200 tons in new projects.*

AWARDS

750 Tons, Danbury, Conn., Federal jail to Truscon Steel Co., Youngstown; Edmund J. Rappoli Co., Cambridge, Mass., contractor.

650 Tons, New London, Conn., two buildings, submarine base, to Bethlehem Steel Co.; through Turner Construction Co., Boston, contractor.

140 Tons, Philadelphia, courthouse, to Bethlehem Steel Co., Bethlehem, Pa.

100 Tons, Cranston, R. I., bridge, to Concrete Steel Co., Boston.

CENTRAL AND WESTERN STATES

1354 Tons, Redding, Cal., Central Valley project (Invitation 33016-A), to Columbia Steel Co., San Francisco.

750 Tons, Chicago, vocational school, to Calumet Steel Co., Chicago.

548 Tons, Los Angeles, welded mesh for Metropolitan Water District, to Patten-Blinn Lumber Co., Los Angeles.

325 Tons, North Platte, Neb., bridge, to Sheffield Steel Corp., Kansas City, Mo.; through Missouri Valley Bridge, contractor.

308 Tons, San Francisco, barracks, to Gilmore Fabricators, Inc., San Francisco; through Pioneer Construction Co., contractor.

300 Tons, Topeka, Kan., auditorium, City Hall, to Laclede Steel Co.; through F. M. Spencer, Topeka.

213 Tons, Mare Island, Cal., navy dormitory, to Bethlehem Steel Co., San Francisco; through K. E. Parker Co., San Francisco, contractor.

207 Tons, Madison, Wis., sewage treatment plant, to Joseph T. Ryerson & Son, Inc., Chicago.

200 Tons, Pontiac, Mich., addition to General Hospital, to Jones & Laughlin Steel Corp., Pittsburgh; through Taylor-Gaskin, Inc., Detroit.

200 Tons, Madison, Wis., women's dormitory, to Truscon Steel Co.; through Maurice Schumacher, contractor.

179 Tons, Woodland, Wash., Lewis River bridge, to Northwestern Equipment Co., Portland, Ore.; through L. H. Hoffman, Portland, contractor.

175 Tons, Kalamazoo, Mich., medical building, State Hospital, to Calumet Steel Co., Chicago.

163 Tons, Chicago, hospital, to Concrete Steel Co., Chicago; through Simpson Construction Co.

158 Tons, Traverse City, Mich., State Hospital employee building, to Calumet Steel Co., Chicago.

147 Tons, Lake County, Ill., paving work, to Truscon Steel Co.; through Kapschull & Co.

147 Tons, Chicago, armory, to Ceco Steel Products Co., Omaha; through Thorgersen & Ericksen Co.

130 Tons, Kismet, Kan., railroad bridge, to Truscon Steel Co.; Kansas City Bridge Co., contractor.

125 Tons, Millbrae, Cal., grammar school, to Gilmore Fabricators, Inc., San Francisco.

115 Tons, Highwood, Ill., water filtration plant, to Joseph T. Ryerson & Son, Inc.; through Leininger Construction Co.

115 Tons, Wauwatosa, Wis., high school, to Inland Steel Co.; through Joseph T. Ryerson & Son, Inc., Chicago; Seltzer-Ornst, contractor.

110 Tons, Detroit, grade separation, Davison Avenue at Grand Trunk Railroad, to Bethlehem Steel Co., Bethlehem, Pa.; through Bryant & Detwiler Co., contractor.

110 Tons, Ypsilanti, Mich., girls' dormitory, Michigan State Normal College, to Taylor & Gaskin, Inc.; through Henry C. Weber Construction Co.

110 Tons, Highland Park, Ill., filtration plant, to Inland Steel Co., Chicago; through Joseph T. Ryerson & Son, Inc.; Leininger Construction Co., contractor.

100 Tons, Kalamazoo, Mich., men's dormitory, State Teachers' College, to Calumet Steel Co., Chicago.

PENDING REINFORCING BAR PROJECTS

NORTH ATLANTIC STATES

13,000 Tons, Boston, metropolitan sewer project; to be advertised this week.

1000 Tons, State of New Jersey, highway projects; bids close Dec. 28.

900 Tons, Kittery, Me., Piscataqua bridge.

400 Tons, Medford-Everett, Mass., Boston metropolitan sewer project.

340 Tons, Cumberland County, Pa., route 30, section 4.

340 Tons, Pittsburgh, W. Liberty Avenue and Saw Mill Run grade separation.

250 Tons, Providence, R. I., combination police and fire station.

225 Tons, Pittsburgh, river front boulevard and wharf improvement.

138 Tons, Philadelphia, railroad bridge (Ashburner Street).

132 Tons, Richmond, Va., Barrett's Ferry bridge.

100 Tons, Clifton, N. J., highway project, route No. 6.

100 Tons, Allegheny County, Pa., Leechburg Road.

100 Tons, Bangor, Me., police station and municipal garage; C. E. Burton Co., Portland, Me., contractor.

CENTRAL AND WESTERN STATES

2600 Tons, Chicago, storage building, Mundie & Jensen.

600 Tons, Cincinnati, city garage; Penker Construction Co., general contractor.

500 Tons, Oakley or Neroly Junction, Cal., Contra Costa pumping plant (Invitation B-47370-A); bids in.

395 Tons, State of Wisconsin, four bridges; bids Dec. 20.

350 Tons, Cleveland, bridge, Lake Shore Drive.

280 Tons, Cleveland, Big Creek culvert in Brookpark; Patterson-Leitch Co., Cleveland, low bidder.

260 Tons, Chicago, Marine Drive apartment building.

200 Tons, State of Missouri, highway bridges for State Highway Commission; bids Dec. 16 at Jefferson City.

200 Tons, Cleveland, east approach of Main Street bridge; bids Dec. 30.

190 Tons, St. Louis, Stowe Teachers College, John Hill Construction Co., low on general contract.

180 Tons, Pike County, Ohio, State bridge; new bids Dec. 27 (previously noted).

150 Tons, Covington, Ky., school, to Truscon Steel Co., Youngstown; through J. & E. Warm Co., Cincinnati, general contractor.

105 Tons, Denver, waterworks.

104 Tons, Lafayette, Ind., telephone building.

100 Tons, Logansport, Ind., infirmary building.

100 Tons, San Francisco, Lawton School.

Unstated tonnage, Youngstown, Ohio, housing project. Youngstown Builders Syndicate, general contractor.

Unstated tonnage, Olympia, Wash., capitol buildings.

Unstated tonnage, McChord Field, Wash., barracks.

Unstated tonnage, Fitzsimmons, Colo., Army hospital.

HAWAIIAN ISLANDS

2000 Tons, Hickman Field, T.H., 3200-man barracks; bids Jan. 6.

. . . CANADA . . .

. . . *British contracts are expected in larger volume*

TORONTO, Dec. 13.—Indications of additional large war material contracts from Great Britain are revealed in announcements by Canadian industrial executives who have recently returned from England, who state that further business will be more diversified and will include tanks, guns of various types, etc. For more than a year Canadian companies have been carrying on experimental work on small orders with the result that a number now are ready to launch into large production.

Victor M. Drury, president of Canadian Car & Foundry Co., announced that his company has received another substantial order for light airplanes from Britain, which is an addition to that included in orders allotted to the Canadian Associated Aircrafts, Ltd. Owing to news restrictions imposed by the British, however, no information will be handed out regarding the types to be produced at this time.

Officials of Dominion Steel & Coal Corp. announced that continued improvement in the steel inventory situation in Britain presages further step-up in Canadian shipments to that country. With continued improvement in Great Britain, Dominion Steel, chief exporter to Britain, will be able to increase production further as the British market takes steel contracted for but shipment of which has been deferred. British steel interests have a contract for 35 per cent of the capacity output of Dominion Steel & Coal Corp.

General domestic demand for iron and steel in the Canadian markets also has shown favorable improvement since the summer, and while sales are slowing down owing to the year-end holidays, it is expected that business will advance rapidly with the turn of the year.

Firmer prices are developing in Canadian scrap prices. Local dealers have marked up prices on heavy melting steel to $10 to $11 per gross ton for No. 1, while No. 2 showed a corresponding advance.

THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

. . . Sales picking up in many sections, contrary to expectations for December . . . Inquiries point to better volume early in 1939.

Fair Volume of Sales Reported in Cleveland

CLEVELAND—Machine tool sales in this district were in fair volume last week. A 52-in. boring mill was sold along with several shapers, planers and engine lathes. Millers have been in fair demand also, one of the latest sales being to an office machinery manufacturer against next year's budget. All in all, current business is slightly in excess of earlier expectations and while seasonal inactivity is looked for consistent demand for small tools will help sustain the market over the next few weeks.

Sharp Spurt in Lathe Ordering at Cincinnati

CINCINNATI—Paced by a sharp increase in lathe ordering, machinery demand moved upward in this area the past week. No surprise was expressed by manufacturers since the early receipt of these orders was expected for some weeks. The new lathe business, the greater portion of which was from domestic sources, was sharply above the market average. One interest is reported to have bought six crankshaft lathes, while other orders were for one or two units. Grinding and milling tools are at the level of preceding weeks, while heavy machinery is in regular although not sensational demand. Inquiry is still in fair volume and reflects continued broad interest in retooling.

Market in the East Shows Spotty Pickup

NEW YORK—The market in the East is still spotty, but some dealers report an increased volume of business the past week, indicating that for some sellers December may yet prove a better month than November as far as order volume is concerned. A week ago there was little of encouragement in the picture. The market is spotty to the extent that buying is still limited to a few concerns, including those in the aircraft industry. Year-end buying on the part of a prominent electrical equipment manufacturer is primarily what is toning up the present sales volume. Much more diversified buying is expected after the first of the year when the new budgets are opened up.

Inquiries Active, But Orders Slow in Middle West

CHICAGO—December will probably be a rather slow month for machine tool sellers here. Orders are being received in small volume but inquiries are quite active. Optimism for the first quarter of next year is undimmed. The trade still feels consumers are holding back until the attitude of the new Congress is definitely determined. The large program of the International Harvester Co. for many of its various plants throughout the Middle West is probably the most important inquiry to come before this market in 1938, and will be prominent in bookings throughout most of the coming year.

Detroit Inquiries Wait on 1940 Model Decisions

DETROIT—Extruded Metals, Inc., Belding, Mich., which has just been organized, is installing machinery and equipment for the production of extruded brass rods, wire, architectural bronze and aluminum. In regard to automotive buying, it is believed that 1940 model car designs will be decided upon shortly after the first of the year and this should provide the clue to increased inquiries for machine tools.

Obituary

(CONTINUED FROM PAGE 68)

WILLIAM J. CHALMERS, retired chairman and co-founder of the Allis-Chalmers Mfg. Co., Milwaukee, died, Dec. 10, at his home in Chicago, aged 86 years. From his youth Mr. Chalmers was engaged in making mining machinery, and the Allis-Chalmers company grew to be one of the largest such manufacturers in the world, as wall as an important producer of many other types of machinery. Born and educated in Chicago, Mr. Chalmers studied machinery under his father, a machine company superintendent, and returned from a trip abroad in 1872 to form the partnership of Fraser, Chalmers & Co. In 1891, this company was consolidated with the E. P. Allis Co. as the Allis-Chalmers Mfg. Co., with Mr. Chalmers as head, where he remained until his retirement in 1906. An extensive traveler, Mr. Chalmers had visited practically all the world's important mining areas. During the World War he was a leader in Belgian relief work, and throughout much of his life was active in civic, social and philanthropic affairs.

❖ ❖ ❖

HORACE B. SPACKMAN, formerly vice-president of the Lukens Steel Co., Coatesville, Pa., died of heart disease in that city on Dec. 11, aged 76 years. He entered the employ of the company in 1881 and became purchasing agent 11 years later. He was made a director in 1897 and vice-president in 1900. He served in that capacity until his retirement in 1929. A son, G. Donald Spackman, is general superintendent of the Lukens company.

❖ ❖ ❖

CHARLES Q. GAREY, former chief designer at National Acme Co., Cleveland, died at his home in Cleveland Heights, Ohio, Dec. 1. Prior to going to Cleveland he had been associated with Pratt & Whitney at Hartford, Conn., and Bryant Grinder and Jones & Lamson companies at Springfield, Vt.

. GREAT BRITAIN .

. . . Prices reduced, effective Jan. 1 . . . Business revival expected.

LONDON, Dec. 13.—Effective Jan. 1 to June 30, British price reductions include basic pig iron, 7s. 6d.; hematite, 12s. 6d.; ship plates, 17s. 6d.; rails, 12s. 6d.; semi-finished steel, 10s. to 15s.; merchant bars, hoops, strips, 12s. to 18s.; black sheets (home trade only), 20s.; galvanized sheets (home trade only), 25s.; steel scrap, 8s. 6d.

The general reception of these new prices has been favorable, and a revival of business is anticipated, once the holidays and the year-end are over, as consumer stocks need replenishment. A recent order included 4000 tons of rails for Denmark and 500,000 lb. of large pipe for South Africa.

Tin plate bars have been reduced 10s., effective January to June, but it is generally considered insufficient to materially affect tin plate prices. Business is quiet with export bookings only about 20 per cent of the total. It is possible that base box substance will be reduced from 108 lb. weight to 100 lb. weight in conformity with other countries. If adopted, it will mean a price reduction of 4½ d. a base box.

Continental steel business is still quiet, and little change is expected before the new year.

Germany is planning to increase yearly capacity by 10,000,000 tons in eight years. Fourteen new high capacity blast furnaces will be constructed, including three in Austria and the Goering Steel Works, and 18 new works are planned.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Continental Can Co., 100 East Forty-second Street, New York, has let general contract to Austin Co., Cleveland, for one-story branch plant, 160 x 400 ft., at Oil City, Pa., for production of sealed cans for lubricating and other oils, to include one-story adjoining structure for storage and distribution, and several smaller buildings. Cost about $500,000 with equipment.

Quinn Engineering Co., 370 Lexington Avenue, New York, air-conditioning systems and equipment, has leased two-story and basement building at 48-50 Watts Street, about 12,000 sq. ft. of floor space, for plant.

Construction Service, Veterans' Administration, Washington, asks bids until Dec. 27 for power house equipment at institution in Bronx, New York, including boilers and accessories, fuel oil tank, radial brick stack, piping, etc.

Carl G. Pfeiffer, commissioner of public works, Peekskill, N. Y., asks bids until Dec. 17 for municipal refuse incinerating plant, including furnaces, conveyors and other equipment. Gascoigne & Associates, Woolworth Building, New York, are consulting engineers. Cost estimated at $83,000.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Dec. 19 ball bearings (Circular 114), sockets (Circu'ar 115); until Dec. 21 for dynamotors, mountings, etc. (Circular 99).

Royal Typewriter Co., 2 Park Avenue, New York, will begin superstructure soon for one-story Canadian branch plant on Park Avenue, Montreal, for its subsidiary, Royal Typewriter Co., Ltd., 731 Bourget Street, Montreal, for parts production and assembling. Cost close to $100,000 with machinery. T. Pringle & Son, 485 McGill Street, Montreal, are architects.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Dec. 30 for one horizontal boring, drilling and milling machine (Circular 93).

American Screw Products Corp., Newark, N. J., formerly located at 38 Littleton Avenue, has leased a two-story building at 31-35 Wilsey Street, totaling 10,000 sq. ft. of floor space, for plant.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Dec. 19 for three motor-driven putteeing machines (Circular 438), blank cartridges, 24-gage, shot shell (Circular 442); until Dec. 20, one automatic trimming machine (Circular 447), 3600 lb. galvanized flat nailless steel strapping, ⅝-in. wide (Circular 444), two profile and alignment gages (Circular 443); until Dec. 21, one three-column hydraulic press (Circular 450).

Board of County Education, Court House, Camden, N. J., Albert M. Bean, county superintendent, plans manual training department in new two-story regional high school at Lindenwold, N. J., for which bids have been asked for erection. Cost $575,000, of which $259,363 represents a Federal grant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 20 for one portable boring bar (Schedule 5074), two motor-driven engine lathes (Schedule 5076) for Philadelphia Navy Yard; circuit breakers, rheostats and resistors (Schedule 5049) for Philadelphia and Brooklyn yards.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Dec. 19 for modernizing and motorizing three turret lathes (Circular 529); until Dec. 20, heat-treated aluminum alloy castings (Circular 532), one bluing machine, 21-in. wide, power-operated, with electric glue heater, for binder work (Circular 534); repairing, reconditioning and altering six bullet assembly presses (Circular 500), one 21,000-lb. horizontal, hydraulic broaching machine (Circular 539); until Dec. 22 for 275,000 left spacer die castings (Circular 530).

BUFFALO DISTRICT

Clarke Hardware Co., 13 East Third Street, Jamestown, N. Y., plans two-story and basement storage and distributing plant, 100 x 100 ft., on River Street. Cost close to $50,000 with equipment. Beck & Tinkham, Bailey Building, are architects.

George Q. Moon & Co., North Depot Street, Binghamton, N. Y., plans rebuilding flour mill recently destroyed by fire. Loss close to $100,000 with equipment.

State Department of Education, State Education Building, Albany, N. Y., asks bids on general contract until Dec. 22 for power house at New York State Normal School, Fredonia, N. Y. Cost over $100,000 with equipment. Work will be carried out in conjunction with other new buildings, for which a total fund of about $591,000 has been arranged.

NEW ENGLAND

Continental Screw Co., 459 Mount Pleasant Avenue, New Bedford, Mass., screws, bolts, rivets, etc., has filed plans for one-story steel cleaning processing unit, 48 x 98 ft. Frank A. Walker, New Bedford, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 20 for one electric steel melting furnace (Schedule 5053), two toolroom lathes (Schedule 5072), six engine lathes (Schedule 5073), four milling machines and extra equipment (Schedule 5071), two 12-in. high-speed shapers (Schedule 5070), all motor-driven, for Boston Navy Yard.

Hamilton Machine Co., Malden, Mass., manufacturer of machinery and parts, plans rebuilding part of storage and distributing division recently destroyed by fire. Loss close to $35,000 with equipment.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Dec. 20 for steel, malleable iron, gray iron and bronze castings (Circular 209), cartridge stop and belt stop springs, 10,000 latch and 36,000 steel springs, 6000 compensating springs and 6000 operating rod springs (Circular 184); until Dec. 22, portable stacker (Circular 186); until Dec. 28, broaching machines (Circular 188).

WASHINGTON DIST.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 21 for two 5000 cu. ft. motor-driven air compressors, with inter and after-coolers, for navy yard, Pearl Harbor, T.H. (Specifications 9028).

Consumers Utilities Co., Winchester, Va., plans expansion and improvements in artificial gas plant, including equipment to double present capacity; also extensions and improvements in pipe line distributing system and other operating facilities. E. C. Goss is general manager.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Jan. 3 for stove bolts, rivets, cotter pins, nuts, screws, gasoline torches; wire terminals, lens for welding goggles and other equipment (Circular 398-43).

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 21 for six one-ton, two two-ton and two 10-ton chain hoists, 25,000 conduit locknuts, 2000 ft. of rigid steel conduit, manganese bronze welding rods, brass pipe, copper pipe, 20,000 lb. of steel wire nails, 8000 lb. of galvanized steel wire nails, 36 sets of pipe die-stocks, drills, twist drills, hand taps, files, hacksaw blades, shovels, hand spades, machinist's vises, galvanized wire rope, rubber insulated cable, copper cable, electric cable and other equipment (Schedule 3404); until Dec. 23, one motor-driven woodworking bandsaw, malleable iron unions, gate valves, globe valves and other equipment (Schedule 3405).

Navy Department, Washington, has approved plans for new naval air base at Isla Grande, near Pan-American Airways port, San Juan, P.R., to include steel hangars, repair and reconditioning shops, general machine shops, administration and other buildings. Cost about $4,000,000. Appropriation will be arranged soon and work placed under way early next year.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 20 for steel wire nails (Schedule 5021), carbon-molybdenum steel valves (Schedule 5022), motor-driven band resaw without motor, two bandsaws and one set of tools (Schedule 5043), 32 turbine-driven, forced-draft main blowers and spare parts (Schedule 5052) for Eastern and Western yards; four 22,500-lb., and five 18,000-lb. steel anchors (Schedule 5048) for Camden and Sewall's Point yards.

SOUTH ATLANTIC

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 20 for one arc welding machine for Charleston, S. C., Navy Yard (Schedule 5058).

P. L. McCall and C. K. Dunlay, Hartsville, S. C., have leased former Midway mill property at Rockingham, N. C., for new paper mill, specializing in production of tissue paper stocks. Plant will be ready for operation early in coming year. A company will be organized to operate mill.

SOUTH CENTRAL

Electro-Manganese Corp., Knoxville, Tenn., recently organized, has acquired former plant of Knoxville Table & Chair Co., near Middlebrook Pike, and will remodel for processing of manganese ore. Plant will be ready for production early in 1939. K. M. Leute is president, and W. W. Osborne, secretary and treasurer.

Louisiana State Board of Education, State Capitol, Baton Rouge, La., has rejected bids recently received on general contract for one-story Southwestern Louisiana trade school, Crowley, La., and for Huey P. Long memorial trade school at Winnfield, La., and will ask new bids soon on revised plans. Structures will cost over $100,000 each with equipment. C. Errol Barron and Charles T. Roberts, Alexandria, La., are architects for Crowley school; J. W. Smith & Associates, Monroe, La., are architects for school at Winnfield.

City Council, Lake Providence, La., plans power house for municipal water system, including installation of 1000-hp. engine unit, pumps, tanks and auxiliary equipment. Bond issue of $250,000 has been voted for this and extensions and improvements in water system.

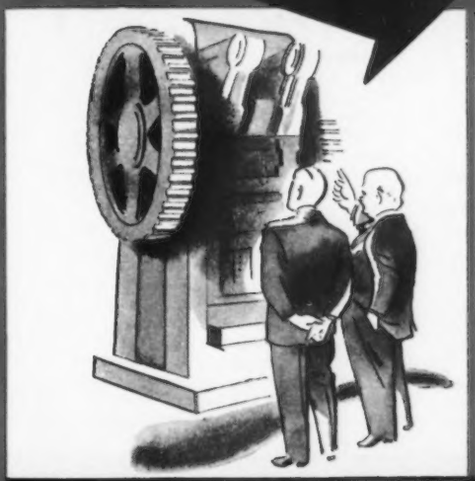
SOUTHWEST

City Council, Lathrop, Mo., asks bids until Dec. 19 for new municipal electric power plant, including two 150-kw. diesel engine-generating units and accessory equipment. Cost about $75,000. Financing has been arranged through Federal aid. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Federal Compress & Warehouse Co., Pine Bluff, Ark., plans one-story compress plant and warehouse unit, with capacity of 50,000 bales of cotton at one time. Cost over $200,000 with compress machinery, mechanical-handling and other equipment. J. A. Sibley is general manager.

Board of Education, Sand Springs, Okla., has asked bids on general contracts for two-

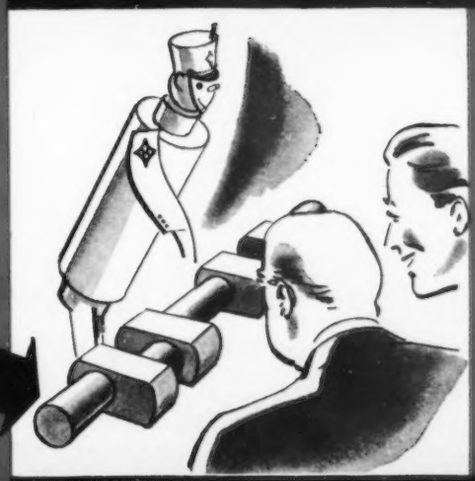
"SUPER" FORGING PUTS NEW LIFE IN A PRESS



"CRANK BREAKAGE ON THIS PRESS IS AVERAGING ONCE A WEEK . . .

"WE'RE WAY BEHIND SCHEDULE . . . WHAT CAN WE DO ABOUT IT?"

"'SUPER' FORGING REPORTING, GENTLEMEN . . . I'VE GOT THE ANSWER."



"THIS HEPPENSTALL CRANK (2-C-30 ALLOY) CAN TAKE THE RAP."

(Later) "YOU'RE RIGHT, 'SUPER'... TWO YEARS... AND STILL GOING!"

AT YOUR SERVICE . . .
These Aids To Industry.

You, too, may have some problem like this one . . . an actual instance from the service files of Heppenstall. Heppenstall forgings, die-blocks, or shear knives may help you to solve it. These products *start* with finer steel . . . produced in a modern plant, and backed by three generations of active experience. The service-life reflects the extra care and skill behind each operation.

HEPPENSTALL PRODUCTS . . .

Die Blocks . . . Shear Knives . . . Hammer Rams . . . Piston Rods . . . Tinning and Galvanizing Rolls . . . Gellert Tongs . . . Locomotive Axles, Pins and Rods . . . E.I.S. and O.H. Alloy Steels . . . Carbon and Alloy Forgings.

HEPPENSTALL — H — Heppenstall has the Experience — QUALITY

HEPPENSTALL COMPANY

PITTSBURGH · BRIDGEPORT · DETROIT

story addition to manual arts high school. Cost about $40,000 exclusive of equipment. Koberling & Fleming, 1400 South Boston Street, Tulsa, Okla., are architects.

City Council, Owensville, Mo., asks bids until Dec. 19 for municipal electric power plant and equipment, including diesel engine-generating units and accessories. Cost about $105,000, of which $47,000 will represent a Federal grant. Russell & Axon, 4903 Delmar Boulevard, St. Louis, are consulting engineers.

Union Bottling Works, Inc., Beaumont, Tex., has asked bids on general contract for new one and two-story mechanical-bottling plant at 610 Buford Street. Cost about $45,000 with equipment. Heartfield & Woodside, American National Bank Building, are architects.

National Battery Co., Dallas, Tex., electric storage batteries and parts, plans rebuilding part of plant recently destroyed by fire. Loss close to $40,000 with equipment in separator department, casting division and mixing room. Main offices of company are on Roblyn Avenue, St. Paul, Minn.

City Council, Crosbyton, Tex., asks bids until Dec. 19 for municipal electric power plant, including two 120-kv. diesel engine-generating units and accessory equipment. Cost about $94,000. Municipal Engineering & Finance Co., Mercantile Building, Dallas, Tex., is consulting engineer.

WESTERN PA. DIST.

Oil Well Supply Co., Colbert Avenue, Oil City, Pa., oil well equipment, has let general contract to L. O. Bouquin Co., Oil City, for one-story building, 75 x 150 ft., in Siverly district, for storage and distribution. Cost about $55,000 with equipment.

Pennsylvania Industrial Chemical Co., Clairton, Pa., plans early rebuilding part of plant recently destroyed by fire. Loss about $140,000 with equipment.

Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, has let general contract to Werner Co., 1320 Pierre Street, Shreveport, La., for one-story factory branch, storage and distributing plant at Shreveport. Cost about $80,000 with equipment. Henry E. Schwarz, Slattery Building, Shreveport, is architect.

MICHIGAN DISTRICT

Michigan Steel Equipment Co., Jackson, Mich., recently organized, has leased part of local building of American Fork & Hoe Co. for production of forged steel products under a special process. Facilities will be provided for employment of about 50 men for initial operations, with opening of plant early in 1939. New company is headed by D. S. Larson, founder, and formerly president of Larson Steel Products Co., Buchanan, Mich.

Kelly Ink Co., Kalmazoo, Mich., printing inks and allied products, has let general contract to H. L. Vander Horst, Kalamazoo, for new one-story plant. Cost about $40,000 with equipment. Leroy & Newlander, Kalamazoo, are architects.

K. Shapiro, Inc., 1533 Winder Street, Detroit, meat packer, has asked bids on general contract for one and two-story plant at East Vernor Highway and Grand Trunk Railroad, 100 x 230 ft. Cost over $65,000 with equipment.

Village Council, Clinton, Mich., is having plans prepared by Fargo Engineering Co., Jackson, Mich., consulting engineer, for municipal electric power plant, for which financing in amount of $122,200 has been arranged.

OHIO AND INDIANA

Kline Mfg. Co., 214 Neilson Street, Port Columbus, Ohio, manufacturer of mechanical equipment, has selected local property, 60 x 200 ft., for new one-story machine shop, to occupy practically entire tract. Cost over $45,000 with equipment.

Gus Juengling & Son, 2869 Massachusetts Avenue, Cincinnati, meat packers, have asked bids on general contract for one and two-story and basement addition, 33 x 62 ft. Cost close to $50,000 with equipment. John J. Wilkens, 1107 Bates Avenue, is architect.

Central Greyhound Lines, Ninth Street and Superior Avenue, Cleveland, has let general contract to National Concrete Fireproofing Co., Citizens Building, for new motorbus service, repair and garage building at East Twenty-sixth Street and Hamilton Avenue, N.E. Cost over $175,000 with equipment.

Cincinnati Milling Machine Co., plans one-story addition, totaling about 100,000 sq. ft. of floor space, for expansion in foundry division. Cost over $200,000 with equipment. Later extensions will be made to increase unit from three to four times floor area noted. Carlton E. Brown is company engineer.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 19 for flexible brass tubing, ¼ to 1 in diameter, and flexible steel tubing, ½ in. diameter (Circular 426); until Dec. 20, 21 motor assemblies (Circular 445); until Dec. 21, propeller stand assembly, propeller balancing stand bushings, puller assemblies, wrenches, pistons, tool assemblies, inserter assembly, etc. (Circular 438); until Dec. 22, 100 to 156 sets of propeller brake assemblies (Circular 434), 60 power-driven transfer fuel pumps and four base and gear box assemblies (Circular 436); until Dec. 29, 75 supercharger regulator assemblies (Circular 446).

Philco Radio & Television Corp., Philadelphia, has acquired Conservador Refrigerator Division of Fairbanks, Morse & Co., Chicago, with plant at 2060 Northwestern Avenue, Indianapolis, and will operate as a division of organization in future. Production of electric refrigerators will be continued for present by new owner, which has leased plant property. Plans are under way for a new model refrigerator to be in production in January. W. Paul Jones is general manager of Philco Refrigerator Division.

MIDDLE WEST

Procter & Gamble Mfg. Co., 1232 West North Avenue, Chicago, soaps, washing powders, edible oils, etc., plans one-story addition at 1614-34 North Magnolia Avenue, 100 x 200 ft., for storage and distribution, with conveyor bridge connecting with present plant. Cost about $135,000 with equipment. Jensen & Teutsch, Associated, 1105 West Lawrence Avenue, are architects. Main offices of company are at Cincinnati.

Commonwealth Edison Co., 72 West Adams Street, Chicago, has authorized surveys for expansion and improvements in Northwest electric generating station, North California Street, with installation of a new 50,000-kw. high-pressure topping turbo-generator unit, high-pressure boilers and auxiliary equipment, and modernization in present equipment to develop an increase of about 40,000-kw. in existing rating. Work will require about 24 months for completion and is scheduled to begin early in 1939. Cost about $8,000,000.

Minnesota Mining & Mfg. Co., Forest and Farquier Streets, St. Paul, Minn., manufacturer of abrasive products, etc., has filed plans for four-story and basement addition, 103 x 165 ft., to replace an existing plant unit. General contract has been let to William M. Murphy & Son, New York Building. Cost close to $250,000 with equipment. Toltz, King & Day, Inc., Pioneer Building, is architect and engineer.

City Council, Cascade, Iowa, asks bids until Dec. 26 for new municipal electric power plant, including station building, tower base, oil tanks, etc. (Section 1); two diesel engine-generator units, with combined capacity not less than 600-hp., with accessory equipment and piping (Section 2), electrical equipment in station, including switchboard, instruments, etc. (Section 3), and electrical distributing system (Section 4). Cost about $110,000. Financing has been arranged through Federal aid. Young & Stanley, Inc., 211 Iowa Avenue, Muscatine, Iowa, is consulting engineer.

United States Engineer Office, Fort Peck, Mont., asks bids until Dec. 19 for two horizontal high-head pumping units, two vertical low-head pumps and one sump pump (Circular 177).

Supervising Construction Engineer, Indian Service, Billings, Mont., asks bids until Dec. 21 for four boiler units for Fort Lapwai, Idaho.

PACIFIC COAST

Schlumberger Well Surveying Corp., 3625 Long Beach Boulevard, Long Beach, Cal., oil well operator, has let general contract to Austin Co., Los Angeles, for two one-story buildings, each 37 x 121 ft., for equipment storage and distribution, with repair and reconditioning facilities. Cost about $45,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 28 for equipment for power house at Puget Sound Navy Yard, Bremerton, Wash., including boiler unit to operate at 400-lb. gage pressure, capacity of 125,000 lb. of steam per hr., with water-cooled walls, oil-burning equipment, superheater, air preheater, water heaters, pumps, fans, air and flue gas ducts, soot blowers, continuous blow-down system, feed water treatment equipment, combustion control system, and complete piping and wiring system (Specifications 8821).

Continental Aeronautic Corp., Los Angeles, recently organized by W. R. Angell, president, Continental Motor Corp., Detroit, and associates, has leased property on Alameda Avenue, Burbank, comprising about 23 acres improved with a one-story building of about 160,000 sq. ft. of floor space, and will improve for plant for fabrication of metal parts for airplanes, including metal wings, wing tips, braces, spars and allied parts. Operations will begin early in January. E. J. Rivers, formerly an executive with North American Aviation, Inc., Los Angeles, aircraft manufacturer, will be vice-president of new company; W. R. Angell, Jr., will be vice-president; and R. M Allan, secretary and treasurer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 6 for nine geared-head engine lathes (Schedule 5068), one horizontal milling machine (Schedule 5065), two 12-in. vertical shapers (Schedule 5064), one engraving machine (Schedule 5063), one hydraulic test pump (Schedule 5057), two heavy-duty buffing lathes (Schedule 5069), all motor-driven, for Mare Island Navy Yard.

FOREIGN

Fairey Aviation Co., Ltd., Heaton Chapel, near Manchester, England, manufacturer of airplanes and parts, plans several one-story units for increase in all departments of parts manufacture and assembling. Facilities will be provided for about 2000 additional workers. Cost over $2,000,000 with machinery.

Colonial Sugar Refining Co., Ltd., Sydney, New South Wales, Australia, has acquired waterfront property in Pyrmont district for new plant for manufacture of special insulating and building board products, using sugar cane fiber as raw material. It will comprise a main one and multi-story unit, with smaller buildings for storage, etc., power house, machine shop and other mechanical structures. Cost over $250,000 with equipment.

North Star Oils, Ltd., Scott Building, Winnipeg, Man., plans new oil refinery at St. Boniface, Man., for production of fuel oils, gasoline, etc., with steel tank storage and distributing facilities. Cost close to $350,000 with equipment. T. N. Clayton is general manager.

The Lea Mfg. Co., Waterbury, Conn., has recently become a distributer for the American Cyanamid & Chemical Corp. in the sale of industrial cyanides for use in the electroplating industry.

Bendix Products Corp. has completed transfer of its marine products division from South Bend, Ind., to Brooklyn, N. Y. Office of Victor W. Kliesrath, president of the division, is 754 Lexington Avenue, New York.